The Chemours Company
1007 Market Street
PO Box 2047
Wilmington, DE 19899

302-773-1000 t
chemours.com

January 6, 2020

Ms. Eleni Kavvadias
U.S. EPA Region 2
290 Broadway Ave, 24th Floor
New York, NY 10007-1866

Standard Operating Procedures for the Ongoing 2016 Residential Drinking-Water Well Surveying and Sampling Program, Chemours Chambers Works, Deepwater, New Jersey (Revised Date: January 2020)

Dear Ms. Kavvadias:

Attached please find the *Standard Operating Procedures for the Ongoing 2016 Residential Drinking-Water Well Surveying and Sampling Program, Chemours Chambers Works, Deepwater, New Jersey (SOPs), Revised Date: January 2020*. This document was developed by the Chemours Company (Chemours) as part of the Resource Conservation and Recovery Act (RCRA) corrective action program under the oversight of the U.S. Environmental Protection Agency (EPA) through the Hazardous and Solid Waste Amendments of 1984 (HSWA) Permit No. NJD002385730. This SOP document was initially submitted to Mr. Benny Conetta of EPA and to Ms. Helen Dudar of the New Jersey Department of Environmental Protection (NJDEP) for comments on May 15, 2018, in response to a request by EPA and NJDEP during the April 25, 2018 meeting and as mentioned in the Chemours' Response to Comments Letter on the Comprehensive RCRA Facility Investigation (dated May 11, 2018).

On March 1, 2019, Chemours received an email from Mr. James Haklar (EPA) titled *Comments Pertaining to the May 15, 2018 Standard Operating Procedures (SOPs) for the Ongoing 2016 Residential Drinking-Water Well Surveying and Sampling Program, Chemours Chambers Works* that contained comments from EPA and NJDEP on the May 15, 2018 submission. In response to those comments, Chemours provided a response to comments letter on May 30, 2019 that identified each of EPA and NJDEP's comments and how it would be addressed in the Revised SOPs. An additional set of comments from EPA and NJDEP on Chemours' response to comments letter was received by Chemours in an email from Mr. Haklar on September 17, 2019.

The attached SOPs (Revised Date: January 2020) include all procedures from the identification of potential drinking-water wells and residential contacts by Chemours to offer drinking-water well sampling, through the implementation of treatment and ongoing operation, maintenance, and monitoring (OM&M), or follow-up monitoring (Qualification Re-Evaluation Program), where appropriate. Please review these SOPs and note that throughout this document is language that indicates that upon or with approval of these SOPs, specific procedures will be followed. Because these SOPs will likely be shared with residents and others outside of EPA and NJDEP, Chemours is proposing that upon approval of the SOPs by EPA and NJDEP, this language be replaced to include the actual date of approval. Chemours will implement the SOPs immediately upon approval

and will submit the document with the actual approval date inserted, where appropriate, within one week of the approval date.

If you have any comments or questions on the SOPs, or want to discuss further the proposed path forward regarding replacing text with the date of approval, please call me at 302-773-1289.

Sincerely,

Andrew S. Hartten
Principal Remediation Project Manager
Chemours Corporate Remediation Group

cc: Helen Dudar, NJDEP Case Manager (hard copy)
AECOM Chambers Works File (60593797/60595223)
Chemours File

Standard Operating Procedures for the Ongoing 2016 Residential Drinking-Water Well Surveying and Sampling Program

Chemours Chambers Works
Deepwater, New Jersey

Submitted on behalf of:
The Chemours Company
1007 N. Market Street
Wilmington, DE 19898

Submitted by:
AECOM
Sabre Building
Suite 300
4051 Ogletown Road
Newark, DE 19713

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Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

This document provides the standard operating procedures (SOPs) for implementing the ongoing 2016 Residential Drinking-Water Per- and Polyfluoroalkyl Substances[1] (PFAS) Surveying and Sampling Program (ongoing 2016 program) near and around the Chemours Company (Chemours) Chambers Works Complex (Chambers Works) in Deepwater, New Jersey. This document covers all processes from the identification of potential drinking-water wells and residential contacts by Chemours to offer drinking-water well sampling, through the implementation of treatment and ongoing operation, maintenance, and monitoring (OM&M), or follow-up monitoring (Qualification Re-Evaluation Program), where appropriate.

1.1 Background

In 2009, E.I. du Pont de Nemours and Company (DuPont) agreed to implement a voluntary program to sample residential drinking-water wells within a 2-mile radius of Chambers Works. The purpose of this program was to evaluate the distribution of perfluorooctanoic acid (PFOA), one PFAS chemical, in off-site residential drinking-water wells within the survey area and to provide treatment as needed to reduce human exposure to PFOA in drinking water.

The surveying was conducted by developing a mailing list that included approximately 225 names and addresses, performing mass mailings, and establishing a call center to manage sampling requests. The program included the sampling of 110 residential drinking-water wells. Of the 110 drinking-water wells sampled, only one drinking-water well contained a PFOA concentration above the evaluation criterion used at that time. A granular activated carbon (GAC) treatment system was installed in June 2009 to reduce human exposure to PFOA in the drinking water. Quarterly OM&M continues to be conducted to ensure the effectiveness of the GAC treatment system.

In June 2016, Chemours voluntarily began a follow-up survey and PFAS sampling program within the same 2-mile radius of Chambers Works. The purpose of this program was two-fold:

- Further evaluate the distribution of PFOA and 13 other PFAS in residential drinking-water wells within the survey area.
- Reduce human exposure to the three PFAS for which the New Jersey Department of Environmental Protection (NJDEP) has accepted or proposed drinking-water criteria [PFOA, perfluorooctane sulfonate (PFOS) and perfluorononanoic acid (PFNA)].

[1] “Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that have been manufactured and used in a variety of industries around the globe, including in the United States since the 1940s. Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) have been the most extensively produced and studied of these chemicals. Both chemicals are very persistent in the environment….” (https://www.epa.gov/pfas/basic-information-pfas)

For this program, the same mailing list was used as in the 2009 program. Letters were mailed to residents[2] requesting them to respond to the offer of sampling and analysis of the 14 PFAS. Over time, based on the results obtained, the survey area was expanded beyond the 2-mile radius. Currently, the program is referred to as the ongoing 2016 program and as of December 2019, approximately 180 drinking-water wells have been identified with concentrations of PFOA, PFOS and PFNA above the evaluation criteria and have been offered treatment.

Since the ongoing 2016 program began in June of 2016, several of the processes used in the implementation of the program have changed. In addition, the criteria used for evaluation of the PFOA, PFOS, and PFNA results have been lowered, and the PFAS analyte list has been expanded. The purpose of this document is to describe the ongoing 2016 program and to provide descriptions of the current SOPs used to implement the program.

1.2 Document Structure

The following information is presented in this document:

- The PFAS analytical list, the analytical method, and the evaluation criteria to which the results are compared are provided in Section 2.
- The SOP used from the development of a potential drinking-water wells address list, through the reporting of the results when drinking-water wells are sampled is provided in Section 3.
- The SOP used from the determination that a drinking-water well exceeds the evaluation criteria and is qualified for an offer of treatment by Chemours, through the completed treatment implementation is provided in Section 4.
- The SOP used for OM&M of GAC treatment systems after installation by Chemours is provided in Section 5.
- The SOP used from the determination that a drinking-water well does not exceed the evaluation criteria and is not qualified for an offer of treatment, through inclusion in the Qualification Re-Evaluation Program (a seven-year monitoring program of annual and biennial events) is described in Section 6.

Throughout this document are references to Figures 1 and 2, which are flow charts that depict the decision points and paths forward in the ongoing 2016 program as described in the SOPs in Sections 3 through 6. In addition, Figures 1 and 2 are cross-referenced with sections of these SOPs, as appropriate.

[2] In these SOPs, the term “resident” refers to both the owner of the property and the drinking-water well and any person who lives in the residence and consumed the well water but is not the owner of the property (a renter or tenant, for example). However, in Sections 4 and 5, there is a distinction made between a resident and a property owner because only a property owner can accept treatment that requires modification to the property.

2.0 PFAS Analytes, Analytical Method, and Evaluation Criteria

2.1 PFAS Analytes and the Analytical Method

As per the June 2, 2016 *Quality Assurance Project Plan for the Chemours 2016 PFAS Residential Drinking-water Well Surveying and Sampling Program, Chambers Works, Deepwater, New Jersey* (ongoing 2016 project QAPP), drinking-water samples from wells identified in the ongoing 2016 program are received by Eurofins TestAmerica in Sacramento, California, and analyzed by Method 537 (modified). The list of analytes, method abbreviations, Chemical Abstracts Service (CAS) numbers and reporting limits (RLs) in nanograms per liter (ng/L) are as follows.

Analyte	Compound Abbreviation	CAS Num	Reporting Limit (ng/L)
N-ethyl perfluorooctane sulfonamidoacetic acid	NEtFOSAA	2991-50-6	20
N-methyl perfluorooctane sulfonamidoacetic acid	NMeFOSAA	2355-31-9	20
Perfluorobutanesulfonic acid	PFBS	375-73-5	2
Perfluorodecanoic acid	PFDA	335-76-2	2
Perfluorododecanoic acid	PFDoA	307-55-1	2
Perfluoroheptanoic acid	PFHpA	375-85-9	2
Perfluorohexanesulfonic acid	PFHxS	355-46-4	2
Perfluorohexanoic acid	PFHxA	307-24-4	2
Perfluorononanoic acid	PFNA	375-95-1	2
Perfluorooctanesulfonic acid	PFOS	1763-23-1	2
Perfluorooctanoic acid	PFOA	335-67-1	2
Perfluorotetradecanoic acid	PFTeA	376-06-7	2
Perfluorotridecanoic acid	PFTriA	72629-94-8	2
Perfluoroundecanoic acid	PFUnA	2058-94-8	2

In addition, on October 2, 2019, six other PFAS were added to the analyte list by Chemours. The list of analytes, method abbreviations, CAS numbers, and RLs for these six PFAS are as follows.

Analyte	Compound Abbreviation	CAS Num	Reporting Limit (ng/L)
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	4
4,8-dioxa-3H-perfluorononanoic acid	ADONA	958445-44-8	2
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3-OUdS	763051-92-9	2
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9C1-PF3-ONS	756426-58-1	2
Perfluorobutanoic acid	PFBA	375-22-4	2
Perfluoropentanoic acid	PFPA	2706-90-3	2

Note that on the result sheets from the laboratory, which are included in the result letters mailed to residents, the results are reported in units of micrograms per liter (µg/L) where

0.001 µg/L equals 1 ng/L. Note that these SOPs also use parts per trillion (ppt) where 1 ppt equals 1 ng/L or 0.001 µg/L. In addition, note that drinking-water wells that are treated using a GAC system and are included in the quarterly OM&M program (see Section 5) and the GAC system samples are analyzed for PFOA, PFOS, and PFNA only using the same laboratory and analytical method listed above.

2.2 Evaluation Criteria

Currently, Chemours is applying the following evaluation criteria for PFOA, PFOS, and PFNA in drinking-water wells:

- PFOA at 14 ng/L: On November 1, 2017, NJDEP accepted the New Jersey Drinking Water Quality Institute's (DWQI) recommended drinking-water standard of 14 ng/L for PFOA.
- PFOS at 13 ng/L: In June 2018, NJDEP accepted the New Jersey DWQI's recommended drinking-water standard of 13 ng/L for PFOS.
- PFNA at 13 ng/L: The New Jersey DWQI's recommended drinking-water standard of 13 ng/L, which was accepted by NJDEP on November 1, 2017. On September 4, 2018, the NJDEP adopted the maximum contaminant level (MCL) and concurrently amended the Groundwater Quality Standard for PFNA to 13 ng/L.

A drinking-water well that has PFOA equal to or greater than 14 ng/L, or PFOS or PFNA equal to or greater than 13 ng/L will be qualified for an offer of treatment (see Section 3.6 and 4), provided the drinking-water well is the primary source of drinking water for the resident. A drinking-water well that has PFOA less than 14 ng/L, and PFOS and PFNA less than 13 ng/L, will be not be qualified for an offer of treatment but will be included in the Qualifications Re-Evaluation Program (see Section 6). The other 17 PFAS in the analyte list are analyzed for informational purposes only and are not evaluated against criteria.

2.3 Future Modifications to the PFAS Analyte List or the Evaluation Criteria

In the future, if other PFAS criteria for drinking water are proposed or accepted, or if new analytical methods and associated PFAS analyte lists are developed, Chemours analytical chemists will evaluate the new information and make a recommendation as to whether the updated information is appropriate for use for this program. Chemours will then discuss the recommendation with the U.S. Environmental Protection Agency Region 2 (EPA) and NJDEP and determine the path forward. The ongoing 2016 project QAPP will be updated in the first quarter of 2020 to reflect the current analyte list and evaluation criteria.

3.0 Development of Property Owner Contact List Through Issuing of the Result Letters

This section lists the sequential steps that are followed by the Chemours representative in implementing the ongoing 2016 program from the development of a resident address contact list through the issuing of the result letter for the drinking-water wells sampled.

3.1 Residential Contact List Development

A list of residents that are to be included in the current phase of the ongoing 2016 program is developed. Lists of residents to be included in a specific phase are developed via several methods including searches of a tax information database (http://tax1.co.monmouth.nj.us/cgi-bin/prc6.cgi?&ms_user=monm&passwd=data&srch_type=1&adv=2&out_type=2&district=1700), a well search database (NJDEP DataMiner: https://www13.state.nj.us/DataMiner), and/or field reconnaissance by Chemours representatives. In some situations, specific resident address lists or potential drinking-water well location address lists were or may be provided to Chemours by EPA or NJDEP. In addition, new well permits are tracked using publicly available databases and/or a publicly available database tracking service[3] and offer letters are mailed to residents or property owners offering sampling of drinking-water wells.

3.2 Residential Outreach

Each resident included in the current phase of the ongoing 2016 program is contacted and offered sampling of drinking-water wells via mailing a series of three drinking-water well sampling offer letters (referred to in the remainder of these SOPs as “sampling offer letters”), three weeks apart. See Appendix A for an example of the surveying and sampling offer letter typically sent. Electronic copies of offer letters are shared with EPA and NJDEP (see Table 1). In July 2019, Chemours implemented a new process of adding a self-addressed, stamped, response postcard with each offer letter mailed (see Appendix B). The response postcard has several check boxes that encourage the resident to request sampling or otherwise share the reason that the offer is not being accepted. If tax records indicate that the property owner does not live where the potential drinking-water well is located, a duplicate letter is mailed to the property owner’s address that includes the potential drinking-water well address in the subject line to indicate that sampling is being offered. All outreach efforts for residents and property owners are tracked in the evergreen (draft versions that are continuously updated) residential contacts spreadsheet[4] that is used to document responses to offer letters and sampling completed. The evergreen residential contacts spreadsheet is provided to EPA and NJDEP on an approximate monthly basis, prior to project status conference calls. Note that either the resident or the property owner may request sampling of the drinking-water well. The drinking-water well will also be sampled if the

[3] Currently Terradex is the service used by Chemours to track publicly available databases and provides updates each month.
[4] The title of this evergreen spreadsheet has varied over time based on the phase of the investigation being implemented. With approval of these SOPs, the title of this spreadsheet will change to Evergreen Residential Contacts XXXXXX, where XXXXXX is the month, day and year through which the spreadsheet has been updated (for example, 102919 for October 29, 2019).

resident requests sampling, but the owner does not or is non-responsive to the sampling offer.

3.3 Process Responses to the Sampling Offer Letters

Sections 3.3.1 through 3.3.5, respectively, describe the procedures to be followed for the responses to the sampling offer letters including:

- Letters returned to Chemours
- Letters mailed for which there is no response from the resident
- Responses where there is no well or the well is not used
- Responses that are declines of the sampling offer
- Responses where the offer to sample is accepted

All responses are tracked in the evergreen residential contacts spreadsheet.

3.3.1 "Return to Sender" (RTS) Letters Procedures

All letters received back by Chemours as "Return to Sender" (RTS), which indicates that the intended recipient did not receive the letter and are evaluated. Offer letters may be returned by the postal service to Chemours marked as RTS due to a variety of reasons including, but not limited to:

- No Such Number
- No Such Street
- Not Deliverable As Addressed
- Insufficient Address
- No Mail Receptacle
- Attempted – Not Known
- Unclaimed
- Forward Time Expired

In these situations, the Chemours representatives search available tax databases, or contact municipal tax clerks, or conduct field reconnaissance to find additional name or address information to ensure that the resident receives the sampling offer letter. In other cases, the name initially used with the address is changed to "Resident", or the Chemours representative may attempt to hand deliver the sampling offer letter. If several different attempts are made and the Chemours representative still does not believe the sampling offer letter was received by a resident, this information is shared with EPA and NJDEP for additional follow-up.

In addition, some RTS letters are marked as "Vacant." In this case, the Chemours representative will on an annual basis visit the location to see if any signs of occupancy are evident. If so, sampling offer letters will be mailed addressed to "Resident." In addition, the Chemours representative will also track the address using publicly available databases or a publicly available database tracking service, so that if the property changes ownership, the new property owner can be offered sampling of the drinking-water well, if one is used. Property ownership changes and new sampling offers are tracked in the evergreen residential contacts spreadsheets. If the property owner's

address is different from the resident's address and the resident's sampling offer letter is RTS as vacant but the property owner's sampling offer letter is not RTS, the resident's address (and associated owner's address) is tracked as "non-response." Processing of these situations is described in Section 3.3.2.

3.3.2 Non-Response Residents Procedures

All addresses for which residents that are non-response after completion of the mailing process as described in Section 3.2 are documented and tracked. Non-response indicates that because the offer letter was not returned as RTS, Chemours assumes the intended recipient received the offer letter(s) and did not choose to respond either by calling the Chemours representative or filling out the response postcard and mailing it back. For non-response residents, Chemours will perform an annual mailing of one sample offer letter. If the resident responds any time, then Section 3.3 will be followed based on the response. In addition, the addresses for non-response residents will be monitored using publicly available databases or a publicly available database tracking service so that if the property changes ownership, the new resident or property owner can be offered sampling of the drinking-water well, if one is used. In addition, if the tracking service indicates that the address is in foreclosure or lender-owned, Chemours will notify the lender or future owner and offer sampling if and when the drinking-water well is being utilized in the future.

3.3.3 No Well or No Well Used Procedures

All situations where no well is used are documented and tracked. Previously, some residents who have received the sampling offer letter or postcard have notified the Chemours representative that the residence is connected to a public water supply (PWS) or that they have a well, but it is not used as a drinking-water source. For these situations, no further sampling offers are needed. Permits for new well installations are monitored using publicly available databases or a publicly available database tracking service so that if a new drinking-water well is installed, the resident or property owner can be offered sampling of the well.

3.3.4 Declines of the Offer to Sample Procedures

One of the check boxes on the response postcards included with the mailing is for declining the offer of sampling. All postcards returned to Chemours indicating a decline of the offer of sampling or phone calls to Chemours indicating a decline of the sampling offer are documented and tracked. Residents that decline the offer of sampling will be re-contacted on an annual basis by phone or a mailing to again offer sampling. In addition, the addresses for declines will be monitored using publicly available databases or a publicly available database tracking service so that if the property changes ownership, the new resident or property owner can be offered sampling of the drinking-water well, if one is used.

3.3.5 Sampling Offer Accepted Procedures

The Chemours representative logs all resident contact information, phone calls, voice mail messages and postcards that the Chemours representative receives and schedules the sampling of the drinking-water well at the convenience of the resident.

Note that either the resident or the property owner may request sampling of the drinking-water well. The drinking-water well will also be sampled if the resident requests sampling, but the property owner does not or is non-responsive to the offer of sampling.

When a resident first contacts the Chemours representative, the following actions are taken:

1. The Chemours representative returns the phone call within two to three business days of a resident calling the Chemours representative.
2. Upon reaching a resident, the Chemours representative verifies that the drinking-water well is used and is within the appropriate investigation area, and schedules sampling at the resident's convenience. The Chemours representative will also ask if the resident is the property owner.
3. If the drinking-water well is located outside of the current investigation area, the Chemours representative notifies the resident that if the area is expanded to where the well is located, the Chemours representative will follow-up and notify them that sampling is being offered.
4. If the resident then declines the offer of sampling, the process in Section 3.3.4 is followed.
5. If the resident does not answer the phone, the Chemours representative leaves a message asking the resident to call back at their convenience. If the resident does not return the Chemours representative's call, the Chemours representative leaves at least three messages encouraging the resident to return their call. In some cases, the Chemours representative will cold-call the residence to see if the resident can be contacted. If the resident is not home, the Chemours representative will leave a hang tag[5] that indicates that the Chemours representative stopped by and provides contact information to encourage the resident to respond.
6. If the resident is non-responsive to the Chemours representative's multiple attempts to contact with the resident, that information is shared with EPA and NJDEP, for their continued follow-up, if appropriate.

3.4 Drinking-Water Well Sampling

Chemours representatives that conduct PFAS sampling must have completed the AECOM internal PFAS Sampling Training. At the prearranged date and time, the Chemours representative arrives at the residence and typically samples the drinking water from a kitchen tap; although, if the resident requests, samples can be collected from any faucet (outside tap, bathroom, etc.). If the resident has a preexisting treatment system, then a sample of the untreated water that enters the treatment system (identified as "Pre") and a sample of the water treated water that is distributed through the residence (identified as "Post") are collected and analyzed. Drinking-water sampling is conducted as per the ongoing 2016 project QAPP.

Drinking-water samples are typically shipped to the laboratory for analysis on Tuesdays to ensure receipt by the laboratory on a weekday, as issues were encountered previously when samples arrived at the laboratory on weekends. Turnaround time for the

[5] Hang tags are typically left any time the Chemours representative stops by a residence and the resident is not home.

samples is requested to be three weeks from receipt at the laboratory. However, laboratory capacity may dictate the turnaround time provided.

3.5 Data Review and Qualification for an Offer of Treatment

Drinking-water results are reviewed and finalized in accordance with the ongoing 2016 project QAPP. Drinking-water results are compared to the currently applicable screening criteria, which are provided in Section 2.2. Residents with drinking-water that exceed the applicable screening criteria are qualified to receive an offer of treatment from Chemours (see Section 3.6 for the exceptions to date). The process of notifying a resident that a drinking-water well is qualified for treatment is started at the same time as the letter generation process. In cases where the property owner is not the resident, the property owner is also notified that the drinking-water well is qualified for an offer of treatment. The Chemours representative contacts the resident, tells them that the result letter is being generated and will be mailed shortly and that the well exceeds the evaluation criteria and is qualified for treatment. A temporary provision of bottled water is offered until treatment has been implemented. Residents who are not the property owner can still accept the offer of temporary bottled water. If the Chemours representative does not directly speak with a resident, the Chemours representative leaves a message offering temporary bottled water and requesting the resident to call back and let the Chemours representative know if they do or do not want to accept the temporary bottled water provision. In addition, the Chemours representative lets the resident know they will be calling back in a few days to provide additional information on the type of treatment to be offered.

3.6 Notification of Results

Drinking-water result letters are prepared and mailed within seven days of the results being finalized. Electronic copies of the result letters are also provided to the Salem County Health Department, the municipal clerks for the township in which the drinking-water well is located, EPA, and NJDEP (see Table 1). Each time result letters are mailed, EPA and NJDEP are also provided with the evergreen results spreadsheet[6] that includes all results for drinking-water wells sampled as part of the ongoing 2016 program. Associated with the evergreen results spreadsheet is an evergreen map[7], which provides results finalized to date for that specific phase of investigation in the ongoing 2016 program. The evergreen map is provided prior to monthly meetings with EPA and NJDEP. Periodically, a set of comprehensive evergreen maps that include all results for drinking-water wells sampled in the ongoing 2016 program are also updated and shared with EPA and NJDEP.

[6] The title of this evergreen spreadsheet is EPA NJDEP Results Spreadsheet XXXXXX where XXXXXX is the month, day and year through which the spreadsheet has been updated (for example, 102919 for October 29, 2019). With approval of these SOPs, the title of this spreadsheet will change to Evergreen Results Mailed XXXXXX.

[7] The titles of the evergreen maps have varied over time based on the phase of the investigation being implemented. With approval of these SOPs, the title of this evergreen map will change to Evergreen Results Map XXXXXX, where XXXXXX is the month, day and year through which the map has been updated (for example, 102919 for October 29, 2019).

3.6.1 Drinking-Water Wells That Exceed the Evaluation Criteria and Are Offered Treatment

If the drinking-water well results exceed the evaluation criteria (see Section 2.2) and is qualified for treatment, a result letter like that shown in Appendix C is generated. Result letters for drinking-water wells that are above the evaluation criteria include a decline sheet that the resident can use to formally decline the offer of treatment, if they choose to do so. In situations where the resident is not the property owner, a duplicate result letter is mailed to the property owner.

When drinking-water wells exceed the evaluation criteria, the procedures described in Section 4 are followed. If a GAC treatment system is installed, then the procedures in Section 5, which describe the quarterly OM&M program, are also followed.

3.6.2 Drinking-Water Wells That Exceed the Evaluation Criteria and Are Not Offered Treatment

In almost all situations, drinking-water wells that exceed the evaluation criteria (see Section 2.2) receive offers of treatment. However, to date, there have been three types of situations where a drinking-water well that exceeded the evaluation criteria was not offered treatment. These three situations include the following:

- One resident connected the residence to a PWS after the sample had been collected, but before the results were available. When the results showed that the drinking-water well was qualified for treatment, Chemours reimbursed the resident for the PWS connection cost.
- One resident requested sampling of a barn well. The result indicated that the barn well exceeded the evaluation criteria. However, the barn well was later determined not to be the primary source of drinking water; therefore, treatment was not offered. In this case, the primary drinking-water source was the well at the residence, which was below the evaluation criteria.
- A few residents have drilled new wells during the ongoing 2016 program. Any time a new well is drilled, the resident can request sampling once the well is connected to the residence. If the new well drilled did not exceed the evaluation criteria, the GAC treatment system was removed.

3.6.3 Drinking-Water Wells That Do Not Exceed the Evaluation Criteria

If drinking-water well results do not exceed the evaluation criteria and the well is not qualified for treatment, a result letter like that shown in Appendix D is generated and mailed to the resident. In addition, the well would then be included in the Qualification Re-Evaluation Program. The Qualification Re-Evaluation Program is a program that will be implemented with the approval of these SOPs and that consists of seven years of sequential annual and biennial monitoring events, as described in Section 6.

4.0 Treatment Offer for Qualified Drinking-Water Wells Through Completed Treatment Implementation

This section lists the steps that are followed by the Chemours representative in implementing the ongoing 2016 program from the determination that the results for a drinking-water well exceeds the evaluation criteria through the completed treatment implementation.

Residents or property owners receiving an offer of treatment from Chemours are pulled into a separate spreadsheet that tracks the treatment type to be offered and all actions taken from the acceptance or declining of the offer of temporary bottled water through completion of the treatment implementation. This evergreen spreadsheet[8] is provided to EPA and NJDEP on an approximately monthly basis, prior to project update conference calls.

4.1 Treatment Options and Property Ownership

Treatment options offered are a function of the property ownership because only a property owner can accept treatment that requires modification to the property such as installation of a GAC treatment system or PWS connection.

Where there is a resident and property owner, and the property owner accepts the offer of treatment for the drinking-water well, the following treatment options will be offered, as applicable:

- Temporary provision of bottled water until such time as permanent treatment is implemented, and
- Connection to a PWS, where practical, or
- Installation of a GAC treatment system, or
- Provision of long-term bottled water for the resident.

4.1.1 Non-Response to the Treatment Offer Procedures

If the property owner is non-responsive to the offer of treatment, the only treatment option offered to the resident is provision of long-term bottled water. In addition, the Chemours representatives will make several attempts to get the property owner to respond to the offer of treatment. If none of those contact attempts with the property owner are successful, then the Chemours representative will share this information with EPA and NJDEP for additional follow-up. Further, the Chemours representatives will track the address using publicly available databases or a publicly available database tracking service, so that if the property changes ownership, the new owner can be notified of the qualification for treatment.

4.1.2 Declines of the Treatment Offer Procedures

If the property owner verbally declines the offer of treatment by Chemours at any point, the Chemours representative encourages the property owner to sign the decline

[8] The title of this evergreen spreadsheet is the Evergreen Installation Spreadsheet XXXXXX where XXXXXX is the month, day and year through which the spreadsheet has been updated (for example, 102919 for October 29, 2019). With approval of these SOPs, the title of this spreadsheet will change to Evergreen Treatment Status XXXXXX.

paperwork included in the result letter (see Appendix D). Property owners who decline the offer of treatment will be re-contacted on an annual basis by phone or a mailing to verify that the resident still wants to decline the offer of treatment. Residents who are not the property owner will be offered long-term bottled water even if the property owner declines the treatment offer. In addition, the addresses for declines will be monitored using publicly available databases or a publicly available database tracking service so that if the property changes ownership, the new owner can be offered treatment or resampling of the drinking-water well, if one is still used.

4.2 Evaluation of Treatment to be Offered

The Chemours representative evaluates the location of the drinking-water well with respect to existing public water lines to determine whether a connection to PWS will be offered. In some cases, the PWS is contacted to confirm if PWS is available or not. If PWS connection is not offered for the location, the treatment offered is the installation of a GAC treatment system or long-term bottled water.

4.3 The Treatment Interview with the Resident

The Chemours representative re-contacts the property owner of the drinking-water well qualified for treatment and schedules a time to discuss the result letter and explain the treatment option(s) being offered by Chemours. In some cases, the property owner may authorize the Chemours representative to work with the resident on treatment installation.

The Chemours representative arrives at the prearranged meeting time to discuss the result letter, the treatment offered by Chemours and to answer any question the property owner may have regarding treatment or other related topics, if the Chemours representative is qualified to do so. Alternatively, if the Chemours representative is not qualified to answer the specific question, the property owner is referred to EPA or NJDEP.

Listed below are the procedures followed based on the type of treatment offered:

- **Long-Term Bottled Water:** To date, there have only been a few situations where long-term bottled water has been requested by the resident or property owner. When long-term bottled water is offered and accepted, the resident signs a bottled water offer letter (Appendix F), and the Chemours representative sets up a schedule for bottled water delivery and delivery begins.
- **PWS Connection:** If a PWS connection is offered, during the interview with the resident or property owner, the Chemours representative will:
  - Provide an information sheet from New Jersey Department of Health (NJDOH) regarding PFAS in drinking water (updated December 2017; see Appendix E).
  - Explain that the costs of connection will be covered by Chemours, but that future water bills will be the resident's or property owner's responsibility.
  - Answer any questions that the property owner has regarding PWS connection and/or refer the property owner to NJDEP or EPA if questions arise that the Chemours representative is not qualified to answer.
  - Review the Public Water Connection Agreement (see Appendix G). Note only the property owner can sign this agreement.

- **GAC Treatment:** If GAC treatment is offered by Chemours, during the interview with the resident or property owner, the Chemours representative will:
  - Provide an information sheet from NJDOH regarding PFAS in drinking water (updated December 2017; see Appendix E).
  - Provide a photograph of what a typical GAC treatment system looks like (see Appendix H).
  - Evaluate the plumbing in the home via a questionnaire and a visual assessment and make a preliminary decision regarding where the system can be installed, or if space or other constraints require installation outside of the home (typically inside of a stand-alone shed).
  - Discuss the proposed location for the installation of the GAC treatment system with the property owner.
  - Review the GAC Treatment System Installation, Operation, and Maintenance Agreement (O&M Agreement; see Appendix I). Note only the property owner can sign this agreement.
  - Answer any questions that the resident or property owner has regarding GAC treatment and/or refer the resident or property owner to NJDEP or EPA if questions arise that the Chemours representative is not qualified to answer.

After the PWS Connection Agreement or the O&M Agreement is signed by the property owner, the agreement is forwarded to Chemours for countersigning. After the agreement has been countersigned by Chemours, the treatment implementation is scheduled at the resident or property owner's convenience.

4.4 Treatment Implementation

Implementation of treatment follows the steps below based on the acceptance of the treatment offer.

- **PWS Connection:** If the treatment to be implemented is PWS connection, a copy of the signed and counter signed PWS Connection agreement is provided to the property owner. The Chemours representative then assists the property owner in submitting a service application to the PWS. Once the application is approved, the plumbing subcontractor installs residential plumbing from the house to the water meter while the PWS installs the water meter. Once the meter is installed, the PWS starts sending bills directly to the resident or property owner.
- **GAC Treatment System Installation:** If the treatment to be implemented is a GAC treatment system installation, the Chemours representative provides a copy of the signed and counter signed O&M agreement to the property owner and schedules an installation appointment with the resident or property owner. The Chemours representative instructs Envirosafe, the plumbing subcontractor to obtain a water treatment permit. During the installation appointment, the following activities are completed by the Chemours representative:
  - Review the GAC treatment system installation location with the resident or property owner and the plumbing subcontractor and confirm that the property owner has approved of the location. Identify any resident belongings that

need to be moved. No belongings of the resident will be touched or moved without the resident's approval.

- Provide oversight for the installation while the plumbing subcontractor completes all needed work to install the system.
- Inform the resident or property owner when the water will be shut off and when the water is turned back on.

If, at any point in time, the situation seems uncomfortable or unsafe, the Chemours representative and the plumbing subcontractor will stop work, remove themselves from the situation, relocate to a safe place, and contact the AECOM Project Manager and Chemours. If necessary, the Chemours representative may also contact the authorities.

Once the GAC treatment system has been installed, the Chemours representative will review the system with the resident or property owner. The resident is reminded that nothing should be placed near or around the GAC treatment system. The location of the Chemours representative's contact information and the GAC system identifier that read "GAC for PFAS Removal" is pointed out. The three-valve bypass is demonstrated so that the resident or property owner knows that, in case of an emergency, they can bypass their system. The resident or property owner are reminded, however, that it is preferable that only a Chemours representative or the plumbing subcontractor bypass the system. The property owner is then made aware of some possible after effects of the GAC system including bubbles in their water, pockets of air in the line, and that sometimes there are small pieces of carbon that can be seen in a glass of water or bath, but that all of these are normal and will dissipate in the few days following installation. The Chemours representative will again leave contact information and will then inform the resident or property owner of the following:

- The municipality plumbing inspector will be contacting them to schedule the inspection of the treatment system, which is a requirement of the water treatment permit, at their convenience.
- The GAC system will be included in Chemours Quarterly OM&M program (see Section 6) starting in the quarter following the GAC installation date and that the OM&M program includes quarterly sampling to monitor the operation and performance of the system.

5.0 Quarterly OM&M Program for GAC Treatment Systems

This section describes the steps that are followed by the Chemours representative in implementing the ongoing 2016 program for routine monitoring after a GAC treatment system is installed. As with the treatment implementation, in situations where there is a property owner and a resident, the property owner may request that the resident be the point of contact for the quarterly OM&M.

5.1 Scheduling Quarterly OM&M

Beginning with the first quarter after the treatment system is installed, the Chemours representative will call each resident to schedule quarterly sampling. If the resident does not answer the phone, the Chemours representative leaves a message asking the resident to call back at their convenience. If the resident does not return the Chemours representative's call, the Chemours representative leaves at least three messages encouraging the property owner to return her call.

If the resident is still non-responsive to the Chemours representative's attempts to schedule sampling, a letter is sent to the resident (or the resident and property owner) and copied electronically to EPA, NJDEP, the Salem County Health Department and the municipal clerks for the township in which the drinking-water well is located. This letter (see Appendix J) notifies the resident (or the resident and property owner) that the quarterly OM&M is needed because sampling results provide operational data on the performances of the system and is the basis for operational and/or maintenance actions.

5.2 Performing the Quarterly OM&M

During the quarterly OM&M visits, the Chemours representative evaluates the condition of the system, the positions of the bypass valves, and answers any questions the resident has on the operation of the system. If the bypass valves are observed to be in the incorrect position, the Chemours representative will document the bypass condition, place the bypass valves in the correct position, and flush the GAC system by running 10 gallons of water through the treatment system before collecting the water samples. The Chemours representative will also remind the resident of the proper position of the valves and that they should not be moved unless necessary.

The Chemours representative then collects treatment system samples from the sample ports after each carbon bed in the treatment system (BED1 and BED2). Sample collection procedures used are the same as for collecting an initial drinking-water sample from a tap (procedures are documented in the ongoing 2016 project QAPP). During the third quarter of each year, an additional sample is collected from the prior to treatment or PT sample port. Samples are sent to the laboratory to be analyzed for PFOA, PFOS, and PFNA (the three PFAS used as the evaluation criteria described in Section 2.2).

5.3 Sample Analysis and Reporting of Results

The BED1 sample is analyzed each quarter. The BED2 sample remains on hold until the analytical results from BED1 are evaluated. The BED2 sample is analyzed only if the analytical results from BED1 are greater than the RL of 2 ng/L (or 0.002 µg/L as reported in the result sheet provided to the residents). The PT water is only sampled and analyzed in the third quarter of each year. If hold-time exceedances occur in the laboratory, EPA and NJDEP will be notified via email of the exceedance.

After the BED1 (and possibly BED2) analytical results are finalized, a letter including both the analytical results (plus PT analytical results in the third quarter) is mailed to the resident or property owner.

5.4 Carbon Bed Changeouts

A carbon bed changeout will take place if concentrations above the reporting limit of 0.002 µg/L for PFOA, PFOS, or PFNA are detected in the BED2 sample in two sequential quarterly sampling events. Alternatively, carbon beds will be replaced every five years if the change-out criteria are not reached within five years.

5.5 Quarterly Monitoring Reports

After all analytical data for each treatment system sampled during the quarter is finalized, a quarterly report letter is prepared for EPA and NJDEP (see Table 1). The report includes the following information in hard copy and electronic copy, except as noted:

- Identification information for each GAC system installed as of the last day of that quarter
- A figure showing the location of each GAC system installed as of the last day of that quarter
- A summary of the PFOA, PFOS, and PFNA results to date for each treatment system
- Electronic copies only of the TestAmerica laboratory reports associated with the GAC sampling conducted during that quarter

Tables and letters to residents or property owner related to that quarters OM&M activities that include information such as names, addresses, and telephone numbers are not attached to the quarterly report letter, but are included in a separate envelope marked “Private Personal Information (PPI) – Do Not Release.” The following documentation is considered PPI:

- Expanded identification information, with well location and owner information for each treatment system installed as of the last day of that quarter
- Quarterly analytical result letters sent to the property owners
- Letters to residents or property owner who are non-responsive to the request to perform quarterly O&M sampling for that quarter

5.6 GAC System Removal

The Qualification Re-Evaluation Program will be used to determine if removal of a GAC treatment system is appropriate, based on the changes in concentration of PFOA, PFOS, and PFNA in the annual PT samples over time (see Box 5 in Figure 1). This process is described further in Section 6.3.

To date, two residents that initially accepted GAC treatment system installation later decided that they would prefer the GAC system to be removed and to be provided with bottled water as a long-term provision. In these situations, the resident must sign a bottled water acceptance letter, which states that bottled water will be delivered, the GAC system removed, and the GAC agreement becomes null and void.

In addition, to date, there have been four residents with GAC treatment systems installed that have subsequently installed replacement drinking-water wells. In these situations, when the original well is disconnected from the residence and the replacement well is being used, the Chemours representative will sample the replacement well. If the replacement well is qualified for treatment, the GAC system is left in place and OM&M continues. If the replacement well is below the evaluation criteria, the GAC system is removed because treatment of the drinking water is no longer required.

6.0 Drinking-Water Wells Not Qualified for Treatment and the Qualification Re-Evaluation Program

This section describes the Qualification Re-Evaluation Program. The Qualification Re-Evaluation program is a new program that will be implemented with the approval of these SOPs. The program consists of seven years of annual and biennial monitoring events. All drinking-water wells with results that do not exceed the evaluation criteria are automatically included in this program[9]. This program provides follow-up monitoring of the concentration of PFOA, PFOS, and PFNA in the drinking-water wells over time. The program includes a sequential series of two annual events and three biennial events. Drinking-water wells with concentrations of PFOA, PFOS, or PFNA that do not exceed the evaluation criteria after the completion of this series of monitoring events will be discussed with EPA and NJDEP to determine if additional monitoring is warranted or not.

The Qualification Re-Evaluation Program consists of a series of sampling/resampling events offered to drinking-water well residents or property owners following timeframe below:

- Annual #1 – Year 0
- Annual #2 – Year 1
- Biennial #1 – Year 3
- Biennial #2 – Year 5
- Biennial #3 – Year 7

6.1 The Annual #1 Event Analyte Lists

As indicated above, the Qualification Re-Evaluation Program will be implemented following approval of these SOPs. Therefore, residents and property owners with drinking-water well results finalized more than 1 year prior to the approval date of these SOPs are being offered resampling because the original result could be over 3.5 years old. This resampling result will be used as the first sampling event (Annual #1) of the Qualification Re-Evaluation Program (see Box 1 in Figure 2) and only PFOA, PFOS and PFNA will be included in the analyte list. Drinking-water well results finalized within 1 year of the approval date of this document (see Box 2 in Figure 2) will be considered as the first sampling event (Annual #1) of the Qualification Re-Evaluation Program because these results are recent, approximately less than one year old. The first set of results for all new drinking-water wells with results finalized after approval of these SOPs will be used as the first sampling event (Annual #1) of the Qualification Re-Evaluation Program because these results will be the first time the drinking water has been sampled (see Box 3 in Figure 2). Again, note that after the original sampling of a drinking-water well, where either 14 or 20 PFAS were analyzed, only PFOA, PFOS, and PFNA are included in the analyte list for the sequential monitoring events.

If results from any monitoring event in the Qualification Re-Evaluation Program are above the evaluation criteria, the paths forward are as indicated in Box 4 in Figure 2, and in Box 5 in Figure 2 (the OM&M program), if GAC treatment is installed.

[9] If a resident installs a replacement drinking-water well, sampling will be offered as soon as the well is being used as a drinking-water source. Well permits are tracked in Terradex, so in general, the Chemours representative is aware when replacement wells are going to be installed.

6.2 Sequential Monitoring Event Results and Paths Forward

The results from the Annual #1 monitoring event are placed into one of three concentration categories, each of which has a unique path forward, as indicated in Boxes 6, 7, or 8 in Figure 2. The three concentration categories are as follows:

- **PFOA, PFOS, and PFNA All Less than the RL**: If the results for PFOA, PFOS and PFNA for any sampling event are all below the RL of 2 ppt[10], then a resampling event will be offered one year later (see Box 6 in Figure 2), regardless of which sequential sampling event generated the results. If two sequential annual events (Annual #1 and Annual #2 or Biennial #2 and the following year, for example) have results for PFOA, PFOS, and PFNA below the reporting limit, Chemours will evaluate the results for the drinking-water well and surrounding drinking-water well results and will determine if additional monitoring is warranted or not based on discussion with EPA and NJDEP.
- **PFOA, PFOS, and PFNA All Less than the Evaluation Criteria**: If the results for PFOA, PFOS, and PFNA for any sampling event are less than the evaluation criteria (PFOA < 14 ppt and PFOS and PFNA < 13 ppt), resampling will be offered using the above listed sequential monitoring frequency (see Box 7 in Figure 2).
- **PFOA, PFOS, or PFNA Equal to or Greater Than the Evaluation Criteria**: If the results for PFOA or PFOS or PFNA for any sampling event are equal to or above the evaluation criteria (PFOA $\geq$ 14 ppt or PFOS or PFNA $\geq$ 13 ppt), treatment will be offered unless other circumstances exist whereby treatment will not be offered (see Section 3.6.2 for situations encountered to date and see Box 8 in Figure 2).

The path forward from each sequential monitoring event is a function of which of the above described concentration categories the results for PFOA, PFOS, or PFNA fall. The results for any drinking-water well still in the Qualification Re-Evaluation Program after the Biennial #3 event will be re-evaluated to determine if additional monitoring is warranted or not based on discussion with EPA and NJDEP (see Box 9 in Figure 2). Hypothetical scenarios concerning different potential pathways can be found in Appendix K as a tool to aid in understanding Figure 2.

6.3 Inclusion of Drinking-Water Wells with GAC Treatment Installed in the Qualification Re-Evaluation Program

For drinking-water wells where a GAC system has been installed, PT water is sampled on an annual basis during the third quarter of each year as part of the quarterly OM&M program (see Section 5.2). GAC-treated drinking-water wells will be included in the Qualification Re-Evaluation Program if the PT results for PFOA, PFOS, and PFNA for a sampling event are less than the evaluation criteria (see Box 9 in Figure 2). The GAC system continues in the OM&M program and routine quarterly carbon bed sampling and analysis will occur. However, the PT sampling will switch to the Qualification Re-Evaluation Program sampling frequency. Paths forward are a function of the concentration categories that the PT results fall in as indicated below.

[10] Note that 1 ppt equals 1 ng/L or 0.001 µg/L.

- **PFOA, PFOS, and PFNA All Less than the RL**: If the PT results for PFOA, PFOS, and PFNA for a sampling event are below the reporting limit (PFOA, PFOS and PFNA < 2 ppt), then a resampling event will be offered one year later. If two sequential annual PT events have results for PFOA, PFOS, and PFNA below the reporting limit (PFOA, PFOS, and PFNA < 2 ppt), then the results and surrounding drinking-water well results and will be evaluated to see if GAC system removal is warranted or not after discussion with EPA and NJDEP.
- **PFOA, PFOS, and PFNA All Less than the Evaluation Criteria**: If the PT results for PFOA, PFOS, or PFNA for a sampling event are above the reporting limit (PFOA, PFOS or PFNA $\geq$2 ppt) but below the evaluation criteria, then the Qualification Re-Evaluation Program sequential monitoring frequency is followed.

  PT results with concentration of PFOA, PFOS or PFNA that do not exceed the evaluation criteria after the completion of this sequential series of monitoring events through Biennial #3 will be discussed with EPA and NJDEP to determine if additional monitoring is warranted.
- **PFOA, PFOS, or PFNA Equal to or Greater Than the Evaluation Criteria**: if any of the sequential sampling events show that PFOA or PFOS or PFNA for any sampling event are equal to or above the evaluation criteria (PFOA $\geq$ 14 ppt or PFOS or PFNA $\geq$ 13 ppt), then annual sampling as part of the quarterly OM&M program will resume.

  If any annual PT event shows concentrations less that the evaluation criteria, the drinking-water well will be pulled back in the Qualification Re-Evaluation Program at Annual #1.

7.0 References

AECOM. 2016. *Quality Assurance Project Plan for the Chemours 2016 PFAS Residential Drinking-water Well Surveying and Sampling Program*. Chemours Chambers Works Complex, Deepwater, New Jersey. June.

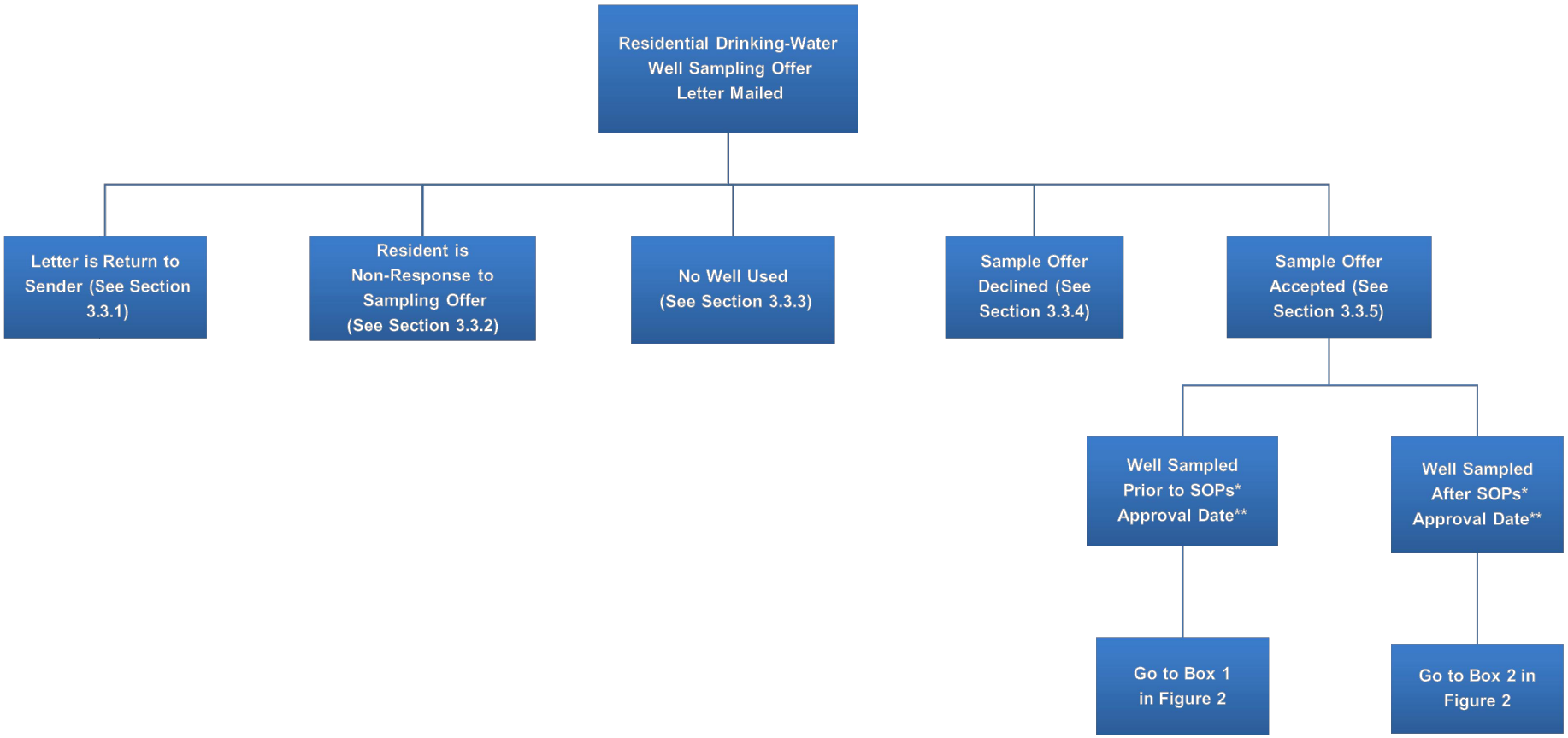
Tables

Table 1
Distribution Lists for Ongoing 2016 Program Letters and Reports
Ongoing 2016 Residential Drinking-Water Well Surveying and Sampling Program
Chemours Chambers Work Complex
Deepwater, New Jersey

Letter or Document	Organization*	Name	Title	Contact Information	Format
Residential Sampling Offer Letter Distribution List	USEPA Region 2	Eleni Kavvadias	Project Manager	kavvadias.eleni@epa.gov	Electronic
	USEPA Region 2	Pat Seppi	Community Involvement Coordinator	Seppi.Pat@epa.gov	Electronic
	NJDEP	Helen Dudar	Case Manager	helen.dudar@dep.nj.gov	Electronic
	NJDEP	Mark Herzberg	Community Relations Coordinator	Mark.Herzberg@dep.nj.gov	Electronic
Residential Result Letter Distribution List	USEPA Region 2	Eleni Kavvadias	Project Manager	kavvadias.eleni@epa.gov	Electronic
	USEPA Region 2	Pat Seppi	Community Involvement Coordinator	Seppi.Pat@epa.gov	Electronic
	NJDEP	Helen Dudar	Case Manager	helen.dudar@dep.nj.gov	Electronic
	NJDEP	Mark Herzberg	Community Relations Coordinator	Mark.Herzberg@dep.nj.gov	Electronic
	Carneys Point Municipal Clerk	June Proffitt	Municipal Clerk, Registrar of Vital Statistics	junep@carneyspointtwp.org	Paper
	Pedricktown Municipal Clerk	Melinda Taylor	Municipal Clerk	clerk@oldmanstownship.com	Electronic
	Mannington Municipal Clerk	Esther Mitchell	Municipal Clerk/Administrator, Registrar of Vital Statistics	townshipclerk@manningtontwp.com	Electronic
	Pennsville Municipal Clerk	Angela Foote	Municipal Clerk	pvclerk@pvtwp.com	Electronic
	Pennsgrove Municipal Clerk	Sharon R. Williams	Borough Clerk, Registrar of Vital Statistics	swilliams@pennsgrove-nj.org	Electronic
	Salem County Department of Health	Rita Shade	Health and Human Services Director	Rita.Shade@salemcountynj.gov	Electronic
GAC Treatment System Quarterly OM&M Program Non-response Letters	USEPA Region 2	Eleni Kavvadias	Project Manager	kavvadias.eleni@epa.gov	Electronic
	NJDEP	Helen Dudar	Case Manager	helen.dudar@dep.nj.gov	Electronic
	Carneys Point Municipal Clerk	June Proffitt	Municipal Clerk, Registrar of Vital Statistics	junep@carneyspointtwp.org	Paper
	Pedricktown Municipal Clerk	Melinda Taylor	Municipal Clerk	clerk@oldmanstownship.com	Electronic
	Mannington Municipal Clerk	Esther Mitchell	Municipal Clerk/Administrator, Registrar of Vital Statistics	townshipclerk@manningtontwp.com	Electronic
	Pennsville Municipal Clerk	Angela Foote	Municipal Clerk	pvclerk@pvtwp.com	Electronic
	Pennsgrove Municipal Clerk	Sharon R. Williams	Borough Clerk, Registrar of Vital Statistics	swilliams@pennsgrove-nj.org	Electronic
	Salem County Department of Health	Rita Shade	Health and Human Services Director	Rita.Shade@salemcountynj.gov	Electronic
GAC Treatment System Quarterly OM&M Report	USEPA Region 2	Eleni Kavvadias	Project Manager	kavvadias.eleni@epa.gov	Electronic
	NJDEP	Helen Dudar	Case Manager	helen.dudar@dep.nj.gov	Electronic

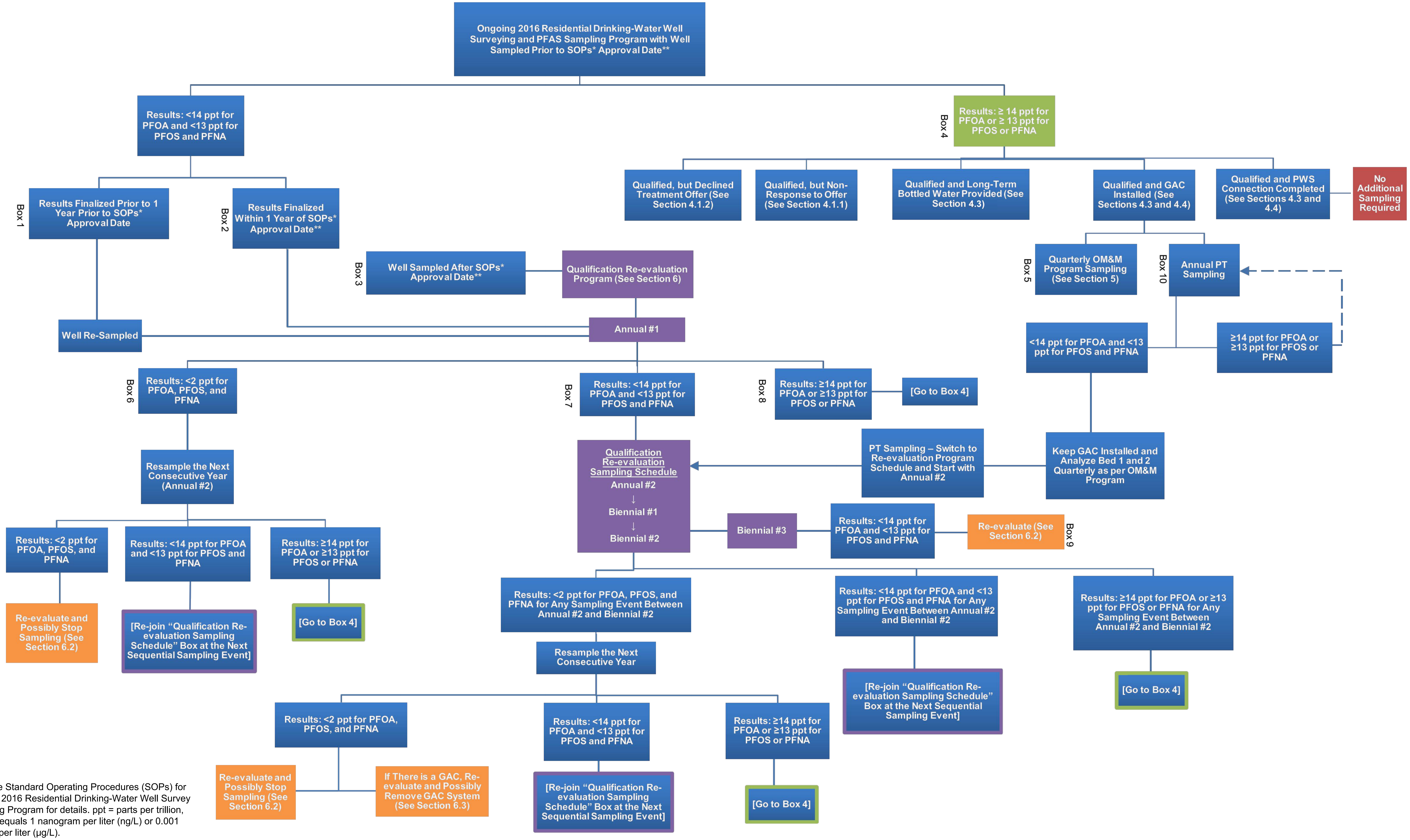
* Municipal Clerks are copied if the letters are mailed to addresses within the township for which they are the municipal clerk.
GAC = Granular Activated Carbon
OM&M = Operation, Maintenance, and Monitoring

Figures



Notes:
* Refer to the Standard Operating Procedures (SOPs) for the Ongoing 2016 Residential Drinking-Water Well Survey and Sampling Program for details.
** Environmental Protection Agency Region 2 (EPA) and the New Jersey Department of Environmental Protection (NJDEP) SOPs Approval Date is to be determined.

DESIGNED BY: C. MIEDZUIS DRAWN BY: D. LITTEL DATA QUALITY CHKD: K. DAVIS APPROVED BY:	AECOM Sabre Building, Suite 300 4051 Ogletown Road Newark, Delaware 19713 Phone: 302-781-5900	RESIDENTIAL DRINKING-WATER WELL SAMPLING OFFER RESPONSE FLOW CHART CHEMOURS CHAMBERS WORKS DEEPWATER, NEW JERSEY	PROJECT NO. 60593793 DATE 12/10/19 FIGURE No: 1



Notes:
* Refer to the Standard Operating Procedures (SOPs) for the Ongoing 2016 Residential Drinking-Water Well Survey and Sampling Program for details. ppt = parts per trillion, where 1 ppt equals 1 nanogram per liter (ng/L) or 0.001 micrograms per liter (µg/L).
** Environmental Protection Agency Region 2 (EPA) and the New Jersey Department of Environmental Protection (NJDEP) SOPs Approval Date is to be determined.

NO.	REVISIONS	BY	DATE

DESIGNED BY: C. MIEDZUIS
DRAWN BY: D. LITTEL
DATA QUALITY CHKD: K. DAVIS
APPROVED BY:

AECOM
Sabre Building, Suite 300
4051 Ogletown Road
Newark, Delaware 19713
Phone: 302-781-5900

QUALIFICATION RE-EVALUATION PROGRAM FLOW CHART

CHEMOURS CHAMBERS WORKS
DEEPWATER, NEW JERSEY

PROJECT NO. 60593797
DATE 12/10/19
FIGURE 2

Appendices

Appendix A

Example of a Surveying and Sampling Offer Letter Sent by Chemours

The Chemours Company
1007 Market Street
PO Box 2047
Wilmington, DE 19899

302-773-1000 t
chemours.com

[redacted]

October 31, 2019

FIRST NOTICE

Drinking Water Well Sampling Offer - Chemours Ongoing 2016 Private Drinking Water Well Surveying and Sampling Program

Please read the information below and use the enclosed self-addressed, stamped postcard to respond to Chemours. Thank you for your participation.

In 2009, E. I. du Pont de Nemours and Company (DuPont) worked in collaboration with the New Jersey Department of Environmental Protection (NJDEP) to conduct a Perfluorooctanoic Acid (PFOA) Private Drinking Water Well Survey and Sampling Program within a two-mile radius surrounding the Chambers Works facility, located in Deepwater, New Jersey. DuPont sampled private drinking water wells to determine if PFOA concentrations in those wells measured 0.40 parts per billion (ppb), or 0.40 micrograms per liter (µg/L), or greater, which was the provisional health advisory established by the U. S. Environmental Protection Agency (USEPA) Office of Water on January 8, 2009.

On July 1, 2015, The Chemours Company (Chemours) became an independent publicly traded company through the spin-off of DuPont Performance Chemicals. Chemours is working in collaboration with USEPA Region 2 and NJDEP to conduct an additional drinking water well sampling program.

Screening criteria have been developed by NJDEP for three separate perfluorinated compounds. On November 1, 2017, the NJDEP accepted the New Jersey Drinking Water Quality Institute's (DWQI's) recommended drinking water standard of 14 parts per trillion (ppt or 0.014 ppb or 0.014 µg/L) for perfluorooctanoic acid (PFOA). Further, in June 2018, NJDEP accepted the New Jersey DWQI's recommended drinking water standard of 13 ppt (0.013 ppb or 0.013 µg/L) for perfluorooctane sulfonic acid (PFOS). In addition, NJDEP has developed a maximum contaminant level (MCL) for perfluorononanoic acid (PFNA) of 0.013 ppb (13 ppt or 0.013 µg/L) effective September 4, 2018.

Results for the current sampling activities conducted near where you reside have shown the presence of PFOA, PFNA and other perfluorinated compounds in drinking water. Chemours is encouraging your participation in the sampling program and requests your permission to sample your drinking water well at this time. If you accept the sampling offer, the water from your well will be analyzed for

PFOA, PFNA, and other perfluorinated compounds, and the results will be provided to you at no cost to you. Your participation in this sampling event is greatly appreciated. We encourage you to schedule your drinking water well for sampling as soon as possible by contacting Ms. Shannon Murphy of Chemours at **(856) 981-1510**. The sampling will be scheduled at your convenience and requires a technician to come to your house for less than 10 minutes to collect a small container of water. If your residence is connected to a public water supply, please call Ms. Murphy and she will remove your information from our mailing list.

For your information, additional facts regarding perfluorinated compounds can be found at https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/perfluorooctanoic-acid-pfoa-perfluorooctyl-sulfonate. If you have any questions regarding this sampling program, please feel free to contact Mr. Mark Herzberg of NJDEP at **(609) 633-1369** or Ms. Pat Seppi of U.S. EPA Region 2 at **(646) 369-0068**.

Sincerely,
The Chemours Company

Andrew S. Hartten
Principal Remediation Project Manager
Corporate Remediation Group

cc: Eleni Kavvadias, EPA Region 2 (electronic)
Helen Dudar, NJDEP (electronic)

Appendix B

Response Postcard

CWK __

Kathy Davis, AECOM
Sabre Building
4051 Ogletown Road
Suite 300
Newark, DE 19713

CWK __

Kathy Davis, AECOM
Sabre Building
4051 Ogletown Road
Suite 300
Newark, DE 19713

Please check the appropriate box and mail this postcard:

☐ I do not have a well.

☐ I do not use my well as my drinking-water source.

☐ I use my well as my drinking-water source:

- ☐ I will call you to schedule sampling.
- ☐ Please call me at _____ to schedule sampling.
- ☐ I decline the offer of sampling.

CWK __

Thank you for your response.

Please check the appropriate box and mail this postcard:

☐ I do not have a well.

☐ I do not use my well as my drinking-water source.

☐ I use my well as my drinking-water source:

- ☐ I will call you to schedule sampling.
- ☐ Please call me at _____ to schedule sampling.
- ☐ I decline the offer of sampling.

CWK __

Thank you for your response.

Appendix C

Example of a Result Letter for a Resident with a Drinking-Water Well Qualified for Treatment

The Chemours Company
1007 Market Street
PO Box 2047
Wilmington, DE 19899

302-773-1000 t
chemours.com

December 20, 2019

[redacted]

Chemours 2016 Ongoing Private Drinking Water Well Surveying and Sampling Program Results – [redacted]

In 2009, E. I. du Pont de Nemours and Company (DuPont) worked in collaboration with the New Jersey Department of Environmental Protection (NJDEP) to conduct a Perfluorooctanoic Acid (PFOA) Private Drinking Water Well Survey and Sampling Program within a two-mile radius surrounding the Chambers Works facility, located in Deepwater, New Jersey. DuPont sampled private drinking water wells to determine if PFOA concentrations in those wells measured 0.40 parts per billion (ppb), or 0.40 micrograms per liter (µg/L), or greater, which was the provisional health advisory established by the U. S. Environmental Protection Agency (USEPA) Office of Water on January 8, 2009.

On July 1, 2015, The Chemours Company (Chemours) became an independent publicly traded company through the spin-off of DuPont Performance Chemicals. Chemours is working in collaboration with USEPA Region 2 and NJDEP to conduct an additional drinking water well sampling program.

Screening criteria have been developed by NJDEP for three separate perfluorinated compounds. On November 1, 2017, the NJDEP accepted the New Jersey Drinking Water Quality Institute's (DWQI's) recommended drinking water standard of 14 parts per trillion (ppt or 0.014 ppb or 0.014 µg/L) for perfluorooctanoic acid (PFOA). Further, in June 2018, NJDEP accepted the New Jersey DWQI's recommended drinking water standard of 13 ppt (0.013 ppb or 0.013 µg/L) for perfluorooctane sulfonic acid (PFOS). In addition, NJDEP has developed a maximum contaminant level (MCL) for perfluorononanoic acid (PFNA) of 0.013 ppb (13 ppt or 0.013 µg/L) effective September 4, 2018.

Attached please find the results of the drinking water well sampling conducted recently by Chemours at your residence or property. Note that results are provided in units of µg/L for 14 perfluorinated compounds, including PFOA, PFOS and PFNA. The PFOA, PFOS and PFNA results for your drinking water well were compared to the above referenced current standards. The results for your well indicate that one or more of the above referenced current standards have been met or exceeded and therefore, your drinking water well will require treatment to meet established standards. A Chemours' representative will be contacting you shortly to discuss the form of treatment that will be

offered to you. If you choose to decline this offer of treatment, please sign below and return this letter in the self-addressed stamped envelope.

If you have any questions regarding your results or this program, please feel free to contact Mr. Mark Herzberg of NJDEP at **609-633-1369**.

Sincerely,
The Chemours Company

Andrew S. Hartten
Principal Remediation Project Manager
Corporate Remediation Group

cc: Eleni Kavvadias, USEPA Region 2 (electronic copy)
Helen Dudar, NJDEP (electronic copy)
Rita Shade, Salem County Department of Health (electronic)
Melinda Taylor, Oldmans Township Municipal Clerk (electronic)

I decline the offer of treatment from Chemours.

_____

(Owner’s Signature and Date of Decline)

Method 537 (mod) NJ : Fluorinated Alkyl Substances

Chemours Company FC, LLC The Sample ID	Eurofins Sample ID	Collection Date/Time	Date Received At Eurofins	Analysis Date	Analyte	Result (ug/L)	Reporting Limit
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	HFPO-DA	0.011	0.0040
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<0.020	0.020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<0.020	0.020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorobutanesulfonic acid (PFBS)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorobutanoic acid (PFBA)	0.022	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorodecanoic acid (PFDA)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorododecanoic acid (PFDoA)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluoroheptanoic acid (PFHpA)	0.023	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorohexanesulfonic acid (PFHxS)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorohexanoic acid (PFHxA)	0.036	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorononanoic acid (PFNA)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorooctanesulfonic acid (PFOS)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorooctanoic acid (PFOA)	0.029	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluoropentanoic acid (PFPA)	0.026	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorotetradecanoic acid (PFTeA)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluorotridecanoic acid (PFTriA)	<0.0020	0.0020
[redacted]	[redacted]	11/20/19 10:00	11/27/19	12/09/19	Perfluoroundecanoic acid (PFUnA)	<0.0020	0.0020

DEFINITIONS:

ug/L = micrograms per liter (parts per billion).

< = less than the stated value.

FOR SAMPLES ANALYZED IN DUPLICATE, THE RESULTS ARE CALCULATED ACCORDING TO THE FOLLOWING CRITERIA:

If the sample and laboratory duplicate are both greater than or equal to 5X their RL and the relative percent difference (RPD) is less than or equal to 20, the average value is reported. If the RPD is greater than 20, the higher value is reported. If the sample or laboratory duplicate is less than 5X their RL, and the absolute difference between the sample and laboratory duplicate is less than or euqal to the sample RL, the average value is reported. If the absolute difference is greater than the sample RL, the higher value is reported. If the sample or the duplicate is greater than or equal to their RL and the other is less than its RL, the higher value is reported. If the sample and duplicate are both less than their RL, the lowest RL is reported.

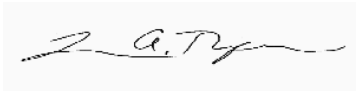
For Table 3 methods, if the sample and laboratory duplicate are greater than their RL, the average is reported. If the sample or the duplicate is greater than or equal to their RL and the other is less than its RL, the higher higher value is reported. If the sample and duplicate are both less than their RL, the lowest RL is reported.

Page 9 of 843

MATRIX SPIKE RECOVERIES:

Eurofins Sample ID	Analyte	Percent Recovery	Percent Recovery Limits
[redacted]	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	82	70 - 130
[redacted]	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	91	70 - 130
[redacted]	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	93	70 - 130
[redacted]	HFPO-DA	118	70 - 130
[redacted]	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	94	70 - 130
[redacted]	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	99	70 - 130
[redacted]	Perfluorobutanesulfonic acid (PFBS)	91	70 - 130
[redacted]	Perfluorobutanoic acid (PFBA)	93	70 - 130
[redacted]	Perfluorodecanoic acid (PFDA)	95	70 - 130
[redacted]	Perfluorododecanoic acid (PFDoA)	98	70 - 130
[redacted]	Perfluoroheptanoic acid (PFHpA)	95	70 - 130
[redacted]	Perfluorohexanesulfonic acid (PFHxS)	94	70 - 130
[redacted]	Perfluorohexanoic acid (PFHxA)	97	70 - 130
[redacted]	Perfluorononanoic acid (PFNA)	100	70 - 130
[redacted]	Perfluorooctanesulfonic acid (PFOS)	92	70 - 130
[redacted]	Perfluorooctanoic acid (PFOA)	99	70 - 130
[redacted]	Perfluoropentanoic acid (PFPA)	100	70 - 130
[redacted]	Perfluorotetradecanoic acid (PFTeA)	91	70 - 130
[redacted]	Perfluorotridecanoic acid (PFTriA)	90	70 - 130
[redacted]	Perfluoroundecanoic acid (PFUnA)	93	70 - 130

SUBMITTED BY:



Laura Turpen, Project Manager I

12/12/2019

Date

Appendix D

Example of a Result Letter for a Resident with a Drinking-Water Well Not Qualified for Treatment

The Chemours Company
1007 Market Street
PO Box 2047
Wilmington, DE 19899

302-773-1000 t
chemours.com

December 20, 2019

[redacted]

Chemours 2016 Ongoing Private Drinking Water Well Surveying and Sampling Program Results – [redacted]

In 2009, E. I. du Pont de Nemours and Company (DuPont) worked in collaboration with the New Jersey Department of Environmental Protection (NJDEP) to conduct a Perfluorooctanoic Acid (PFOA) Private Drinking Water Well Survey and Sampling Program within a two-mile radius surrounding the Chambers Works facility, located in Deepwater, New Jersey. DuPont sampled private drinking water wells to determine if PFOA concentrations in those wells measured 0.40 parts per billion (ppb), or 0.40 micrograms per liter (µg/L), or greater, which was the provisional health advisory established by the U. S. Environmental Protection Agency (USEPA) Office of Water on January 8, 2009.

On July 1, 2015, The Chemours Company (Chemours) became an independent publicly traded company through the spin-off of DuPont Performance Chemicals. Chemours is working in collaboration with USEPA Region 2 and NJDEP to conduct an additional drinking water well sampling program.

Screening criteria have been developed by NJDEP for three separate perfluorinated compounds. On November 1, 2017, the NJDEP accepted the New Jersey Drinking Water Quality Institute's (DWQI's) recommended drinking water standard of 14 parts per trillion (ppt or 0.014 ppb or 0.014 µg/L) for perfluorooctanoic acid (PFOA). Further, in June 2018, NJDEP accepted the New Jersey DWQI's recommended drinking water standard of 13 ppt (0.013 ppb or 0.013 µg/L) for perfluorooctane sulfonic acid (PFOS). In addition, NJDEP has developed a maximum contaminant level (MCL) for perfluorononanoic acid (PFNA) of 0.013 ppb (13 ppt or 0.013 µg/L) effective September 4, 2018.

Attached please find the results of the drinking water well sampling conducted recently by Chemours at your residence or property. Note that results are provided for 20 perfluorinated compounds, including PFOA, PFOS and PFNA. The PFOA, PFOS and PFNA results for your drinking water well were compared to the above referenced current standards. The results for your well were less than each of these values and therefore, your drinking water well is not qualified for treatment.

If you have any questions regarding your results or this program, please feel free to contact Mr. Mark Herzberg of NJDEP at **609-633-1369**.

Sincerely,
The Chemours Company

Andrew S. Hartten
Principal Remediation Project Manager
Corporate Remediation Group

cc: Eleni Kavvadias, USEPA Region 2 (electronic copy)
Helen Dudar, NJDEP (electronic copy)
Rita Shade, Salem County Department of Health (electronic copy)
Melinda Taylor, Oldmans Township Municipal Clerk (electronic copy)

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Chemours Company FC, LLC The Sample ID	Eurofins Sample ID	Collection Date/Time	Date Received At Eurofins	Analysis Date	Analyte	Result (ug/L)	Reporting Limit
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/19/19	HFPO-DA	<0.0040	0.0040
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<0.020	0.020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<0.020	0.020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorobutanesulfonic acid (PFBS)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorobutanoic acid (PFBA)	<0.0020	0.0020
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[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluoroheptanoic acid (PFHpA)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorohexanesulfonic acid (PFHxS)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorohexanoic acid (PFHxA)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorononanoic acid (PFNA)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorooctanesulfonic acid (PFOS)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorooctanoic acid (PFOA)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluoropentanoic acid (PFPA)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorotetradecanoic acid (PFTeA)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluorotridecanoic acid (PFTriA)	<0.0020	0.0020
[redacted]	[redacted]	10/28/19 12:00	10/30/19	11/13/19	Perfluoroundecanoic acid (PFUnA)	<0.0020	0.0020

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< = less than the stated value.

FOR SAMPLES ANALYZED IN DUPLICATE, THE RESULTS ARE CALCULATED ACCORDING TO THE FOLLOWING CRITERIA:

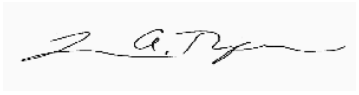
If the sample and laboratory duplicate are greater than 5X RL, the relative percent difference (RPD) is less than 20, the average value is reported. If the RPD is greater than 20, the higher value is reported.

If the sample or laboratory duplicate are less than 5X RL, and the absolute difference is less than RL, the average value is reported. If the absolute difference is greater than the RL, the higher value is reported.

MATRIX SPIKE RECOVERIES:

Eurofins Sample ID	Analyte	Percent Recovery	Percent Recovery Limits
[redacted]	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	104	70 - 130
[redacted]	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	103	70 - 130
[redacted]	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	109	70 - 130
[redacted]	HFPO-DA	112	70 - 130
[redacted]	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	104	70 - 130
[redacted]	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	101	70 - 130
[redacted]	Perfluorobutanesulfonic acid (PFBS)	95	70 - 130
[redacted]	Perfluorobutanoic acid (PFBA)	106	70 - 130
[redacted]	Perfluorodecanoic acid (PFDA)	106	70 - 130
[redacted]	Perfluorododecanoic acid (PFDoA)	102	70 - 130
[redacted]	Perfluoroheptanoic acid (PFHpA)	98	70 - 130
[redacted]	Perfluorohexanesulfonic acid (PFHxS)	91	70 - 130
[redacted]	Perfluorohexanoic acid (PFHxA)	100	70 - 130
[redacted]	Perfluorononanoic acid (PFNA)	106	70 - 130
[redacted]	Perfluorooctanesulfonic acid (PFOS)	102	70 - 130
[redacted]	Perfluorooctanoic acid (PFOA)	103	70 - 130
[redacted]	Perfluoropentanoic acid (PFPA)	93	70 - 130
[redacted]	Perfluorotetradecanoic acid (PFTeA)	91	70 - 130
[redacted]	Perfluorotridecanoic acid (PFTriA)	94	70 - 130
[redacted]	Perfluoroundecanoic acid (PFUnA)	94	70 - 130

SUBMITTED BY:



Laura Turpen, designee for Michelle Johnston, Project Manager II

11/20/2019

Date

Appendix E

New Jersey Department of Health Drinking-Water Fact Sheets: Per- and Polyfluoroalkyl Substances (PFAS) in Drinking Water

Drinking Water Facts:
Per- *and Polyfluoroalkyl Substances (PFAS) in Drinking Water*

Updated December 2017

*formerly titled PFCs in Drinking Water

- **Per- and polyfluoroalkyl substances (PFAS) are a group of chemicals with many commercial and industrial uses.**
- **PFAS have been associated with a variety of adverse health effects in humans, but it has not been definitively established that PFAS cause these effects.**
- **PFOA, PFNA, and PFOS have proposed or recommended drinking water regulations in New Jersey.**

What are PFAS and perfluorinated chemicals (PFCs)?

PFAS are a group of manmade chemicals which include a smaller group of chemicals called PFCs. PFAS repel water and oil, and are resistant to heat and chemical reactions. They therefore have important industrial and commercial uses. PFAS are used in production of some non-stick cookware, in waterproof and stain proof coatings, in "leak-proof" coatings on food packaging materials, in fire-fighting foams, and in other uses. PFAS can enter drinking water through industrial release to water, air, or soil; discharges from sewage treatment plants; land application of contaminated sludge; and use of fire-fighting foam.

PFCs are not broken down in the body. Four types of PFCs have been found in the blood (serum) of greater that 98% of the United States population. **These PFCs build up and stay in the human body for many years, and the amount goes down very slowly over time.**

- **PFOS** – perfluorooctane sulfonate
- **PFOA** – perfluorooctanoic acid
- **PFNA** – perfluorononanoic acid
- **PFHxS** – perfluorohexane sulfonate

How can I be exposed to PFAS?

Some PFAS can dissolve in water. Therefore, drinking water may be a major source of exposure to PFAS for people living in communities with contaminated drinking water. Other sources of PFAS exposure include food, food packaging, consumer products, house dust, indoor and outdoor air, and at workplaces where PFAS are made or used.

Exposure to PFAS in drinking water is primarily from ingestion. Exposure to PFAS through other household uses of water such as showering, bathing, laundry and dishwashing is not significant.

Are PFAS harmful to my health?

There is considerable information on the health effects of PFAS in humans and animals, and more information is continually becoming available. In experimental animals, some PFAS have been found to cause developmental, immune, neurobehavioral, liver, endocrine, and metabolic toxicity, generally at levels well above human exposures. Some studies of the general population, communities with drinking water exposures, and exposed workers suggest that PFAS increase the risk of a number of health effects. The most consistent human health effect findings for PFOA – the most well-studied of the PFAS – are increases in serum cholesterol, some liver enzymes, and uric acid levels. For PFOS, the most consistently found human health effects include increased serum cholesterol and uric acid levels. PFOA and PFOS have been associated with decreased antibody response following vaccination.

PFOA and PFOS caused tumors in rodents. In a community with substantial exposure to PFOA through drinking water, PFOA exposure was associated with higher incidence of kidney and testicular cancers.

How can PFAS affect children?

In experimental animals, some PFAS cause developmental effects. In humans, exposure to PFAS before birth or in early childhood may result in decreased birth weight, decreased immune responses, and hormonal effects later in life. More research is needed to understand the role of PFAS in developmental effects.

Infants and children consume more water per body weight than older individuals, so their exposures may be higher than adults in communities with PFAS in drinking water. They may also be more sensitive to the effects of PFAS.

Continue to Page 2

Continued…

When PFAS are elevated in a drinking water supply, it is advisable to use bottled water to prepare infant formula for bottle-fed babies. Beverages for infants, such as juice made from concentrate, should also be prepared with bottled water. PFAS are present in breast milk. Based on the scientific understanding at this time, since the benefits of breast-feeding are well-established, infants should continue to be breast-fed. Pregnant, nursing, and women considering having children may choose to use home water filters or bottled water for drinking and cooking to reduce exposure to PFAS in your water. However, exposure to fetuses and nursing infants is influenced by past exposures and slow excretion of these substances from the body, so risk reduction will not be immediate.

What levels of PFAS in drinking water are safe?

The New Jersey Department of Environmental Protection (NJDEP) is moving forward with setting enforceable Maximum Contaminant Levels (MCLs) for **PFOA (14 parts per trillion (ppt) [ng/L]) and PFNA (13 ppt)**. NJDEP will also be considering a recommended MCL for **PFOS (13 ppt)**. These levels are based on current scientific information and are intended to protect for lifetime exposure.

USEPA has issued a lifetime drinking water Health Advisory for **PFOA** and **PFOS** of **70 ppt** individually or when concentrations of PFOA and PFOS are combined. A Health Advisory is non-enforceable guidance that identifies the concentration of a contaminant in drinking water at which USEPA has concluded adverse health effects are not anticipated to occur. The proposed and recommended NJ MCLs are more stringent.

How do I know if I have PFAS in my drinking water?

Large public water systems in the U.S. and a subset of smaller water systems were required to test for some PFAS as part of the USEPA Unregulated Contaminant Monitoring program. All of the water systems which tested for PFAS have reported their results in your annual Consumer Confidence Report (CCR). The CCR may be available online or can be provided by your water provider. The only way to know whether your private well has PFAS is to have it tested. To find a laboratory certified to test for PFAS, you can contact NJDEP Office of Quality Assurance at 609-292-3950 or access the information at: https://www13.state.nj.us/DataMiner

What should I do if I am concerned about PFAS in my drinking water?

PFAS are **not** removed from water by boiling. **If tap or well water is found to contain PFAS, people may choose to use home water filters or bottled water for drinking and cooking to reduce exposure to PFAS in their water.**

Granular activated carbon filters or reverse osmosis water treatment devices are technologies that can reduce the level of PFAS in drinking water. If a treatment is used, it is important to follow the manufacturer's guidelines for maintenance and operation. NSF International, an independent and accredited organization, certifies products proven effective for reducing PFOA and PFOS below the USEPA Health advisory level (70 ppt) (http://info.nsf.org/Certified/DWTU/). The Minnesota Department of Health tested several household water treatment devices and found many to be effective. See link: http://www.health.state.mn.us/divs/eh/wells/waterquality/poudevicefinalsummary.pdf

What can blood testing for PFAS tell me?

PFAS can be measured in your blood serum but this is not a routine test. While a blood test may indicate whether you have been exposed to PFAS, results cannot be used to predict your health effects nor can they be linked to specific health problems. Also test results alone cannot be used to specifically identify sources of exposure, and there is no treatment to reduce levels of PFAS in blood. A national program has been measuring PFAS in blood among the U.S. population. This information can be used to determine if the levels of PFAS in your blood are higher than national background levels. For example, if your concentration is higher than the 95th percentile, this means your blood serum concentration is higher than the concentration found in 95% of the U.S. population.

Estimates of four most common PFAS measured in the U.S. general population, 2013-2014 (ng/ml [ppb])

PFAS	Geometric Mean	50th Percentile	95th Percentile
PFOS	4.99	5.20	18.42
PFOA	1.94	2.00	5.51
PFNA	0.67	0.64	1.99
PFHxS	1.35	1.33	5.54

Additional Resources:

http://www.nj.gov/health/ceohs/environmental-occupational/drinking-water-public-health/

Appendix F

Example of a Bottled Water Offer Letter

Chemours™

The Chemours Company
1007 Market Street
PO Box 2047
Wilmington, DE 19899

302-773-1000 t
chemours.com

November 28, 2018

[redacted]

Chemours 2016 Ongoing Private Drinking Water Well Surveying and Sampling Program – Permanent Bottled Water Offer [redacted]

On September 12, 2018, your drinking water well was sampled as part of the Chemours Company (Chemours) 2016 Ongoing Private Drinking Water Well Surveying and Sampling Program. Results mailed to you on October 11, 2018 showed that your drinking water well is qualified for treatment and a GAC system was offered for installation.

To accept this to have bottled water provided as an alternative treatment at this time, please sign and date below and return this letter in the enclosed self-addressed stamped envelope.

Sincerely,
The Chemours Company

Andrew S. Hartten
Principal Remediation Project Manager
Corporate Remediation Group

cc: James Haklar, USEPA Region 2 (electronic copy)
Helen Dudar, NJDEP (electronic copy)

I **accept** the offer to have bottled water provided by Chemours as alternative treatment at this time.

[redacted]

(Owner's Signature and Date)

I decline the offer of treatment from Chemours.

[redacted]

(Owner's Signature and Date of Decline)

Appendix G

Example of a Public Water Connection Agreement

Public Water Connection Agreement

In 2009, E. I. du Pont de Nemours and Company (DuPont) worked in collaboration with the New Jersey Department of Environmental Protection (NJDEP) to conduct a Perfluorooctanoic Acid (PFOA) Private Drinking Water Well Survey and Sampling Program within a two-mile radius surrounding the Chambers Works facility, located in Deepwater, New Jersey. DuPont sampled private drinking water wells to determine if PFOA concentrations in those wells measured 0.40 parts per billion (ppb) or micrograms per liter (µg/L), or greater, which was the provisional health advisory established by the U. S. Environmental Protection Agency (USEPA) Office of Water on January 8, 2009.

In June, 2016, Chemours began a second phase of residential sampling and drinking water wells exceeding the criteria above are qualified for treatment. NJDEP has developed an interim specific groundwater quality criterion for perfluorononanoic acid (PFNA) of 0.01 ppb on November 1, 2017. In addition, on November 1, 2017 the NJDEP accepted the New Jersey Drinking Water Quality Institute's recommended drinking water standard of 0.014 ppb for PFOA. Further, In June 2018, NJDEP accepted the New Jersey DWQI's recommended drinking water standard of 13 ng/L for PFOS. At select locations that use drinking water wells that exceed these criteria, treatment offered is connection to a public water supply, as described below.

I (we), _____, the owner(s) (hereafter referred to collectively as Owner of the parcel of real estate and improvements located at _____ _____(hereafter referred to as the Property), consent to have The Chemours Company (Chemours; formerly DuPont) and its designated contractor(s) enter on to the Property to connect the Property to the New Jersey American Water (NJAW). Owner consent is contingent upon the conditions provided below. Chemours' fulfillment of the obligations specified in this Agreement is also contingent upon the conditions below.

Condition 1. Chemours will provide at its costs all construction, labor, and material necessary to connect the Property to NJAW, including tapping fees and installation fees. The owner will be responsible for payment of costs once connection to NJWA is complete.

Condition 2. Chemours will provide at its cost all labor and materials necessary to restore any damage to the Property that results from Chemours' work connecting the Property to NJAW. Restoration shall consist of returning all improvements on the Property damaged by Chemours to as near as possible the condition existing on the date that such activities begin. Owner agrees that where residential grass is damaged as part of the construction work, reseeding of the damaged area is acceptable.

Condition 3. Chemours will be responsible for personal injury or property damage caused by negligence in the performance of the work described in Conditions 1 and 2. Chemours will not be responsible for any damage caused by Owner's negligence.

Condition 4. Chemours and its contractor(s) may have access to the Property during normal business hours (Monday through Friday between 8:00 a.m. and 5:00 p.m.) to perform the connection and any necessary restoration. When Chemours must enter the primary living space, it will seek with Owner a mutually agreeable time to do so.

Condition 5. Owner grants Chemours the authority to obtain at its cost all necessary federal, state, and county permits for completion of the work described above on behalf of Owner as required.

Condition 6. Chemours' designated contractor(s) will be licensed, bonded, and insured.

Owner(s)' consent is provided on this date, _____ by:

_____ and _____
Owner(s)' Signature Owner(s)' Signature

_____ and _____
Owners(s)' Printed Name(s) Owners(s)' Printed Name(s)

Agree by Chemours:

Andrew S. Hartten, Principal Remediation Project Manager, representing The Chemours Company
Printed Name, Title

_____ _____
Chemours Signature Date

Appendix H

Photograph of a GAC Treatment System

Photograph of a GAC System

Appendix I

Example of a GAC Treatment System Installation, Operation, and Maintenance Agreement

Granular Activated Carbon Treatment System Installation, Operation, and Maintenance Agreement

New Jersey Department of Environmental Protection (NJDEP) has developed a maximum contaminant level (MCL) for perfluorononanoic acid (PFNA) of 13 parts per trillion (ppt), effective September 4, 2018. In addition, on November 1, 2017, the NJDEP accepted the New Jersey Drinking Water Quality Institute's (DWQI's) recommended drinking water standard of 14 ppt for perfluorooctanoic acid (PFOA). Further, in June 2018, NJDEP accepted the New Jersey DWQI's recommended drinking water standard of 13 ppt for perfluorooctane sulfonic acid (PFOS). Based on the NJDEP criteria for PFNA, PFOA and PFOS, and the results for drinking water wells sampled near the Chemours Company (hereafter referred to as Chemours) Chambers Works in Deepwater, New Jersey, Chemours is now offering installation of granular activated carbon treatment (hereafter referred to as GAC Treatment System) if the measured concentration of PFOA, PFOS or PFNA in the drinking water is exceeds any of these criteria in those drinking water wells.

I (we), _____, the owner(s) (hereafter referred to as Owner(s)) of the parcel of real estate and improvements located at _____ (hereafter referred to as the Property), consent to have Chemours) and its designated contractor(s) enter on to the Property to install a GAC Treatment System and connect it to the water supply line running from the Property's well to the primary living space on the Property. The GAC Treatment System is offered to the Owner(s) of the Property by Chemours. Owner(s)' consent is contingent upon the conditions provided below. Fulfillment by Chemours of its obligations specified in this Agreement is also contingent upon the conditions below.

Condition 1. Chemours will provide at its cost all construction, labor and materials necessary to install the GAC Treatment System and connect it to the water supply line running from the Property's source water to the primary living space on the Property.

Condition 2. Chemours will provide at its cost all labor and materials necessary to restore any damage to improvements on the Property that result from Chemours' work installing the GAC Treatment System and connecting it to the water supply line. Restoration shall consist of returning all improvements on the Property damaged by Chemours to as near as possible the condition existing on the date that installation and connection activities begin. The Owner(s) agree that in the case of grass that is damaged as part of the construction work, reseeding of the damaged area is acceptable.

Condition 3. Chemours will pay for all operation and maintenance of the GAC Treatment System, including timely replacement of the carbon filtering medium, based on quarterly sampling and analysis results. All operation, maintenance and filter replacement will be performed by Chemours' designated contractor(s). Chemours will provide for operation and maintenance of the GAC Treatment System until Chemours demonstrates to the satisfaction of EPA that the water system's source water prior to treatment contains PFOA, PFOS or PFNA below regulatory drinking water standards for four consecutive quarters and treatment can then be terminated. When Chemours' obligation to operate and maintain the GAC Treatment System ends, Chemours will pay all expenses to remove the GAC Treatment System entirely and return the Property to its condition before the equipment's installation.

Condition 4. Chemours will be responsible for personal injury or property damage caused by negligence in the performance of the work described in Conditions 1, 2, and 3 or by malfunction of the GAC Treatment System. Chemours will not be responsible for any damage caused by the Owner(s) negligence.

Condition 5. Chemours and its contractor(s) may have access to the Property during normal business hours (Monday through Friday between 8:00 a.m. and 5:00 p.m.) to perform the installation, connection, sampling and any necessary restoration. When Chemours and its contractor(s) must enter the primary living space, it will seek with the Owner(s) a mutually agreeable time to do so.

Condition 6. Owner(s) grant Chemours the authority to obtain at its cost all necessary federal, state, and county permits for completion of the work described above on behalf of Owner(s) as required.

Condition 7. Chemours' designated contractor(s) will be licensed, bonded and insured.

Owner(s)' consent is provided on this date, _____ by:

_____ and _____
Owner(s)' Signature

_____ and _____
Owners(s)' Printed Name(s)

Agree by Chemours:

Andrew S. Hartten, Principal Remediation Project Manager, representing The Chemours Company
Printed Name, Title

_____ _____
Chemours Signature Date

Appendix J

Example of a Letter Sent to Resident Non-Responsive to the Quarterly OM&M Sampling

The Chemours Company
1007 Market Street
PO Box 2047
Wilmington, DE 19899

302-773-1000 t
chemours.com

November 21, 2019

[redacted]

Chemours Chambers Works Survey and Sampling Program
3Q19 Residential GAC System Sampling – [redacted]

Dear [redacted]

Under the terms of your Granular Activated Carbon (GAC) Treatment System Installation, Operation and Maintenance Agreement, Chemours conducts required quarterly GAC system monitoring. Ms. Shannon Murphy of AECOM left several messages for you trying to schedule the 3Q19 GAC system monitoring. She did not receive any response from you and therefore, the 3Q19 GAC system monitoring was not conducted. The quarterly sampling is important because the sampling results provide operational data on the performance of the GAC system. This information is evaluated for proper operations of the GAC system and is the basis for operational and/or maintenance action as may be required for the GAC system.

Each quarter, Ms. Murphy will contact you three times to schedule the GAC system monitoring at your convenience. If you do not respond to her messages, it will be your responsibility to contact her at (856) 981-1510 to arrange for the GAC system monitoring.
Sincerely,

Andrew S. Hartten
Principal Remediation Project Manager
Chemours Corporate Remediation Group

cc: Helen Dudar, NJDEP (electronic copy)
Eleni Kavvadias, USEPA Region 2 (electronic copy)

Appendix K

Qualification Re-Evaluation Program – Hypothetical Examples

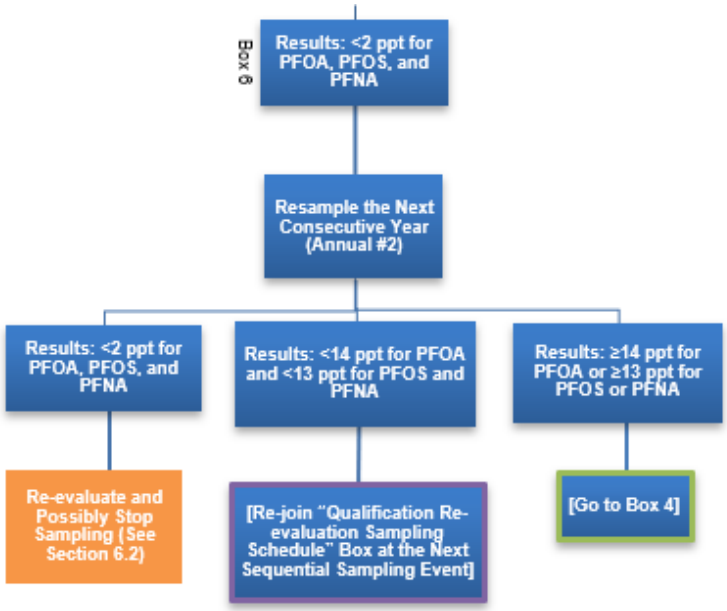
Qualification Re-Evaluation Program – Hypothetical Examples

The following examples pertain to different potential pathways within Figure 2, the Qualification Re-Evaluation Program Flow Chart. Hypothetical sample dates and scenarios were used as a tool to aid in understanding some of the different pathways presented in the figure.

Example 1

If the well was most recently sampled on October 27, 2017 and the results for PFOA, PFNA, and PFOS are 10 parts per trillion (ppt) or 0.010 micrograms per liter (µg/L), the well does not qualify for treatment, and well resampling is necessary because the initial results are approximately two-years old.

If the resample results (annual #1) for perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and perfluorononanoic acid (PFNA) are <2 ppt (0.002 µg/L), the well does not qualify for treatment and will be resampled the next annual year (annual #2) as part of the Qualification Re-Evaluation Program. The portion of the figure associated with Box 6 and shown below will be followed.



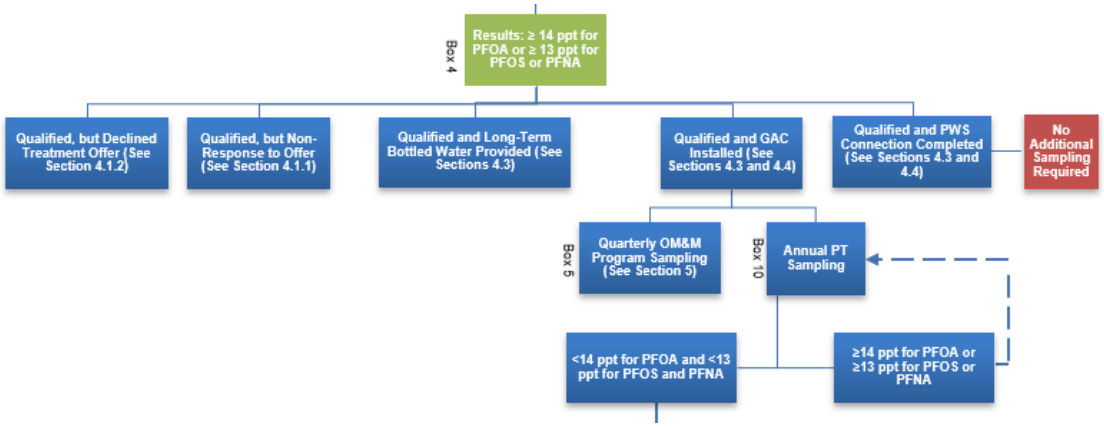
If the resample results for the next annual year (annual #2) for PFOA, PFOS, and PFNA are <2 ppt (0.002 µg/L), then re-evaluation of the results and nearby results with U.S. Environmental Protection Agency (EPA) and New Jersey Department of Environmental Protection (NJDEP) is necessary.

Example 2

If the well was most recently sampled on December 12, 2016, and the results for PFOA, PFNA, and PFOS are 6 ppt (0.006 µg/L), the well does not qualify for treatment and well resampling is necessary because the initial results are approximately three years old.

If the resample results (annual #1) for PFOA, PFOS, and PFNA are <2 ppt (0.002 µg/L), the well does not qualify for treatment and will be resampled the next annual year (annual #2) as part of the Qualification Re-Evaluation Program.

If the resample results (annual #2) for PFOA, PFNA, or PFOS is 20 ppt (0.020 µg/L), the well qualifies for treatment. The portion of the figure associated with Box 4 and shown below will be followed.



Three different treatment options may be available including bottled water provisions, installation of a granular activated carbon (GAC) treatment system, or connection to public water supply (PWS), if available.

The operation, maintenance, and monitoring (OM&M) program annual sampling of the prior to treatment (PT) water will take place as long as the PT sample results continue to be ≥14 ppt (0.014 µg/L) for PFOA and the results for PFOS and PFNA are ≥13 ppt (0.013 µg/L). [See Example 5 for the path forward if the PFOA PT result is <14 ppt (0.014 µg/L) and the PT results for PFOS and PFNA are <13 ppt (0.013 µg/L)].

Example 3

If the well was sampled on March 15, 2019 and the results (annual #1) for PFOA, PFNA, and PFOS are 12 ppt (0.012 µg/L), the well does not qualify for treatment. The well will then follow the qualification re-evaluation sampling schedule and will be sampled the next annual year (annual #2).

If the results (annual #2) for PFOA, PFNA, and PFOS are 9 ppt (0.009 µg/L), the well does not qualify for treatment and will be sampled the next biennial year (biennial #1).

If the results (biennial #1) for PFOA, PFNA, and PFOS are 11 ppt (0.011 µg/L), the well does not qualify for treatment and will be sampled the next biennial year (biennial #2).

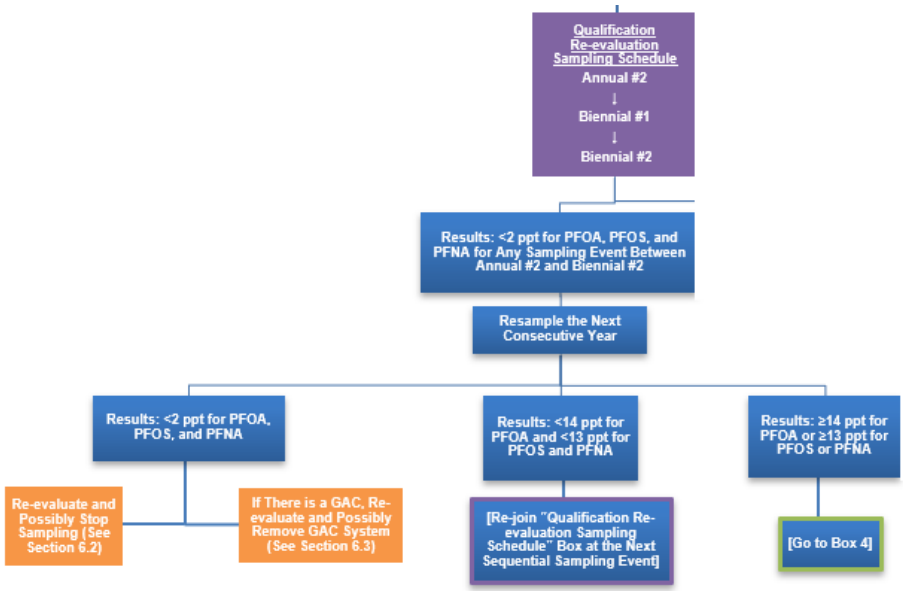
If the results (biennial #2) for PFOA, PFNA, and PFOS are 10 ppt (0.010 µg/L), the well does not qualify for treatment and will be sampled the next biennial year (biennial #3).

If the results (biennial #3) for PFOA, PFNA, and PFOS are 7 ppt (0.007 µg/L), the well does not qualify for treatment and re-evaluation of the results and nearby results with EPA and NJDEP will be necessary.

Example 4

If the well was sampled on October 15, 2019 and the results (annual #1) for PFOA, PFNA, and PFOS are 5 ppt (0.005 µg/L), the well does not qualify for treatment. The well will then follow the qualification re-evaluation sampling schedule and will be sampled the next annual year (annual #2).

If the results (annual #2) for PFOA, PFOS, and PFNA are <2 ppt (0.020 µg/L), the well will be sampled the next consecutive year and will follow this portion of the figure shown below.



If the results for PFOA, PFNA, and PFOS are 7 ppt (0.007 µg/L), the well does not qualify for treatment and will be sampled at the next sequential sampling event (biennial #1).

If the results for PFOA, PFOS, and PFNA are <2 ppt (0.020 µg/L), the well will be sampled the next consecutive year.

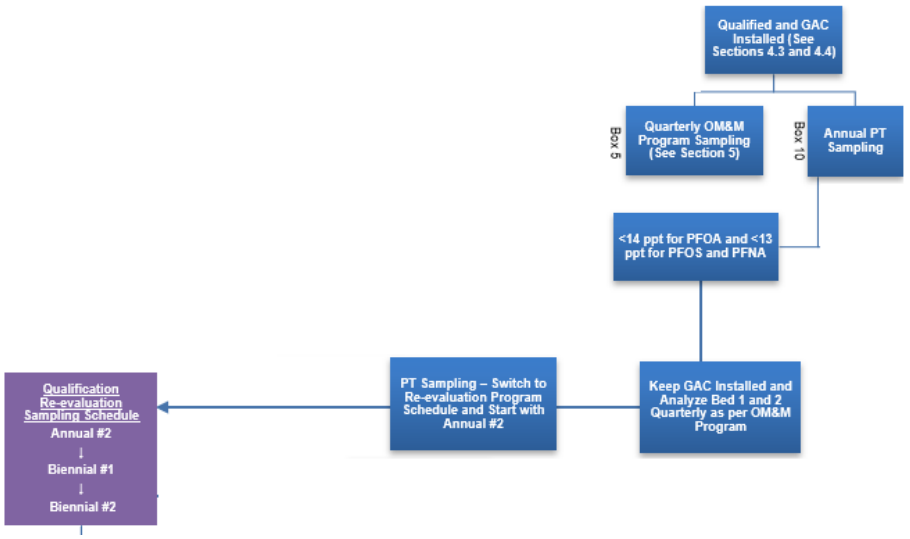
If the results for PFOA, PFOS, and PFNA are <2 ppt (0.020 µg/L), re-evaluation of the results and nearby results with EPA and NJDEP will be necessary.

Example 5

If the well was sampled on July 5, 2019 and the result (annual #1) for PFOA, PFNA, or PFOS is 14 ppt (0.014 µg/L), the well qualifies for treatment. Three different treatment options may be available including bottled water provisions, installation of a GAC treatment system, or connection to PWS, if available.

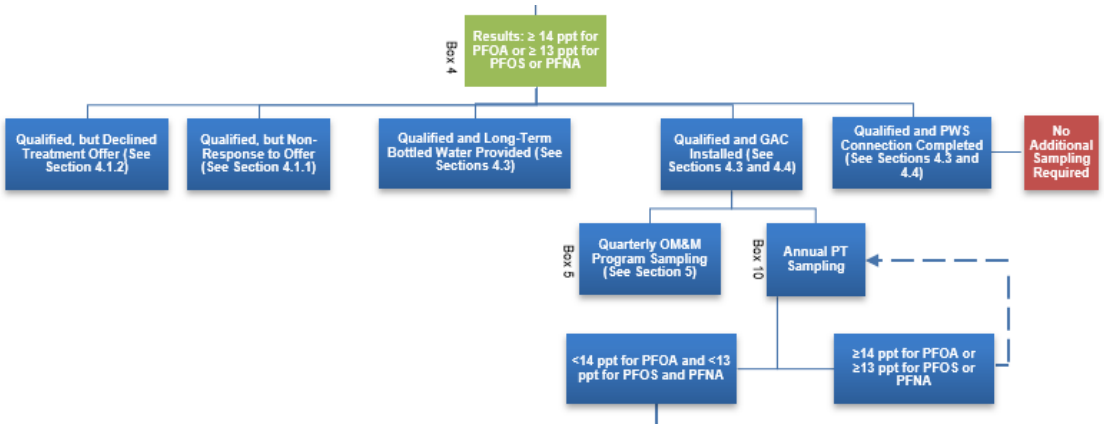
If the well is receiving GAC treatment, the carbon beds will be sampled quarterly for the OM&M program, and the PT water will be sampled annually.

If, for example, after three years of annual sampling as part of the OM&M program, the results for PFOA, PFNA, and PFOS are 10 ppt (0.010 µg/L), those results will used as annual #1 and the PT sampling will adhere to the qualification re-evaluation sampling schedule and will follow this portion of the figure shown below.



The well will be sampled the next annual year (annual #2) and if the results for PFOA, PFNA, and PFOS are 9 ppt (0.009 µg/L), the well does not qualify for treatment and the well will be sampled the next biennial year (biennial #1).

If the results for PFOA, PFOS, or PFNA is 16 ppt (0.016 µg/L), the well water exceeds the evaluation criteria. The PT sampling will continue as part of the OM&M program sampling and will follow the portion of the figure associated with Box 4 shown below.



Annual PT sampling as part of the OM&M program will take place as long as the PT sample results continue to be ≥14 ppt (0.014 µg/L) for PFOA and the results for PFOS and PFNA are ≥13 ppt (0.013 µg/L).